581.946.98
M.8
$1.25

NEW YORK
BOTANICAL GARDEN.

1:1-106, i-xii.	1857.
1:107-262.	1862.
1:263-277.	1864.
1:379-618, t.-p.	1868.
2:1-113.	1872.

See Journ. Ph. 12:288; most of these fasciculi were reviewed in Amer. Chron. as they appeared.

J.H.W.

SKH 22'48 c

A MANUAL FLORA

OF

MADEIRA

AND

THE ADJACENT ISLANDS

OF

PORTO SANTO AND THE DESERTAS.

BY

RICHARD THOMAS LOWE, M.A.

VOL. I.

DICHLAMYDEÆ.

DOMINI est terra, et plenitudo ejus.—Psal. xxiv. 1.

LONDON:

JOHN VAN VOORST, 1 PATERNOSTER ROW.

MDCCCLXVIII.

NEW YORK BOTANICAL GARDEN

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Κρᾶναι καὶ βοτάναι, γλυκερὸν φυτὸν
. . . . . .
Παντᾷ ἔαρ, παντᾷ δὲ νομοί. . .
Theocr. Idyll. 8. 37, 41.

Hic ver assiduum, atque alienis mensibus æstas;
Bis gravidæ pecudes, bis pomis utilis arbos.
At rabidæ tigres absunt, et sæva leonum
Semina: nec miseros fallunt aconita legentes:
Nec rapit immensos orbes per humum neque tanto
Squameus in spiram tractu se colligit anguis.
Virg. Georg. ii. 149–154.

TO

T. VERNON WOLLASTON, Esq., M.A., F.L.S.,

AUTHOR OF 'INSECTA MADERENSIA,' 'CANARIAN COLEOPTERA,' 'COLEOPTERA ATLANTIDUM,' 'COLEOPTERA HESPERIDUM,' 'ON THE VARIATION OF SPECIES,' ETC. ETC.,

OF WHOSE COMPANIONSHIP AND FRIENDSHIP SO MANY

OF THE FOLLOWING PAGES CONTAIN

SOME PLEASANT REMINISCENCE,

THIS VOLUME

IS AFFECTIONATELY OFFERED AND INSCRIBED

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NOTICE.

Impeded by graver avocations, and in prospect of being obliged shortly to suspend altogether further progress by the necessity of leaving England for the benefit of health, I have decided on publishing at once the following portion of the Flora of Madeira; which I offer rather for the local use of invalids, or other persons resorting to the island for a temporary residence, and who may find in these pursuits interest and recreation for themselves or kindly employment in behalf of friends at home, than with the hope of imparting to European botanists much new or valuable matter. Still the following pages will supply, it may be hoped, one desideratum: namely, a more complete and correct catalogue of the living plants, actually or heretofore existing in Madeira and the adjacent islands, than has yet been provided. For, although several more or less accurate or full lists have appeared in print, whilst lately one in manuscript, formed by my regretted friend, Dr. Charles Lemann, partly indeed from his own researches, but completed with reference to a great part of the Madeiran and the whole of the Porto-Santan and Dezertan species from my own catalogue lent him for his private use, has been communicated since his death to several botanists, still there is wanting, in a form accessible to every one, any such authentic and exact register of the plants really growing in Madeira as I may not unreasonably hope to furnish: my present list being the careful fruit of a twenty-six years' constant residence in the island, and of a subsequent six months' visit in 1855, improved by diligent attention to the previous or contemporary labours of others in the same field, and above all by the free use of the important authentic materials deposited in the Banksian and Hookerian Herbaria, accorded by the liberality and friendship of their respective guardians or owner. To Sir W. J. Hooker,

Mr. Robert Brown, and Mr. J. J. Bennett, are indeed owing my most cordial thanks.

On my return to England it is my purpose, if life be spared, not only to complete the present little publication, but to follow it up, as health and leisure may permit, with a series of similar Manuals on the Ferns and other Cryptogamic plants, the Birds and Fishes, Shells or Mollusks, marine and terrestrial, of the island: such as, in conjunction with the elaborate and admirable works of Mr. Wollaston on the Insects, may furnish together a tolerably complete Natural History of the Madeiran group.

In the mean time, no further inconvenience than delay will accrue to the purchasers of the present instalment, in itself complete, of the Phænogamic Flora, by its separate publication. When its sequel is carried through the press, care will be taken to make the paging continuous with that of the part now published, so that the whole may be ultimately bound up in one volume, for which a fresh title-page, with other introductory or prefatory matter, tables, indices, &c., will be supplied.

One word then only for the present to collectors in Madeira. It is a much better plan to take out a sufficient stock of drying-paper for the day's walk or excursion, strapped or tied up between two common boards of suitable size, placing the plants at once when gathered between the sheets, than to collect them in a herborizing-box, not laying them out till the conclusion of the expedition in the evening. A great amount of trouble is thus saved: and, indeed, the heat of the sun in Madeira renders the herborizing-box almost useless, its contents generally withering long before they can be carried home. The roughest wooden boards are better than the best paste-boards, pressing more equably, and affording more protection from a casual shower. At night, a stone of suitable weight placed on the bundle, forms the best possible plant-press.

Lea Rectory, *July 27th*, 1857.

EXPLANATIONS AND ABBREVIATIONS.

Regions or Zones of Vegetation in Madeira.

1. Cactus and Banana.—Tropical, cultivated, reaching from the sea to a height of 700 feet. Characterized by the following plants:—

Cultivated.—Banana, Palm, Sugar Cane, Arrowroot, Rose-apple, Custard-apple, Guava, Fig, Cypress, Bamboo, Oleander, Judas-tree, Carob-tree, Coral-trees (Erythrina), Brugmansia, Bignonia, Hibiscus, Poinsettia, Euphorbia, Duranta, Cæsalpinia, Alpinia, Hedychium, Hoya, Stephanotis, Cereus (*triangularis* L., *speciosissimus* Desf., *phyllanthoides* DC., &c.), Passiflora (*quadrangularis* L., *edulis* Ker, *Lowei* Heer, &c.).

Naturalized.—Prickly Pear (*Opuntia Tuna* Mill.), *Pelargonium inquinans* Ait., *Cassia bicapsularis* L., *Lantana Camara* L., *Ricinus communis* L., *Aloe arborescens* L., *Aloe vulgaris* Lam., *Ageratum conyzoides* L., *Mauraudia semperflorens* Jacq., *Mesembrianthemum cordifolium* L., *Solanum sodomæum* L., *Sol. auriculatum* Ait., *Sida carpinifolia* L., *Commelyna agraria* Kth., *Panicum repens* L., *Paspalum vaginatum* L., *Eleusine indica* Gaërtn., &c.

Indigenous.—Dragon-tree, *Teucrium heterophyllum* Herit., *Jasminum odoratissimum* L., *Chamæmeles coriacea* Lindl., *Sideroxylon Mermulana* Lowe, *Celastrus* (*Catha* Forsk.) *cassinoides* Herit., *Gomphocarpus fruticosus* R. Br., *Helichrysum obconicum* DC., *Euphorbia piscatoria* Ait., *Juniperus phœnicea* L., *Ephedra alata* Decaisne, *Pedrosia glauca* Ait., *Frankenia lævis* L., *Lavandula pinnata* L., *Matthiola maderensis* Lowe, *Sonchus ustulatus* Lowe, *Musschia aurea* L. fil., *Echium nervosum* Ait., *Hyoscyamus canariensis* Ker, *Sempervivum glutinosum* Ait., *Pennisetum cenchroides* Rich., *Andropogon hirtus* L., *Piptatherum multiflorum* Beauv., *Cheilanthes suaveolens* Sw., *Nothochlæna Marantæ* L., *N. vellea* Sw., *Nephrodium molle* R. Br., &c.

2. Vine and Chestnut*.—Temperate, cultivated, from 500 to 2500 feet. The chief characteristic plants are—

* The Chestnut forms from 1500 to 2500 feet a sort of upper belt or border to this zone, below whose upper limit snow never lies longer than a few hours.

Cultivated and naturalized.—The Vine, Cereals, Chestnut, Oak, Cork-tree, Orange, Lemon, Pomegranate, Fig, Mulberry, Peach, Almond, Apricot, Plum, Cherry, Apple, Pear, Quince, Japan Medlar, Walnut, American Aloe, Fuchsias, Heliotrope, Pelargoniums, Australian Acacias and Eucalypti, Stone Pine and Pinaster, Roses, Honeysuckle, *Mesembrianthemum edule* L., *Passiflora cærulea* L., *Oxalis purpurea* Jacq., *Solanum pseudocapsicum* L., *Hydrangea hortensis* Sm., *Rhus Coriaria* L., *Ornithogalum arabicum* L., *Lilium candidum* L., *Arum italicum* L. and *A. Dracunculus* L., *Richardia æthiopica* L., *Amaryllis Bella Donna* L., Common Furze, Broom and Bramble, &c.

Indig.—Dragon-tree, Myrtle, Dog-rose (*R. canina* L.), Madeira Holly (*Ilex Perado* Ait.), *Rhamnus glandulosa* Ait., *Myrica Faya* Ait., *Euphorbia mellifera* Ait., *Genista virgata* Ait., *Adenocarpus parvifolius* DC., *Hypericum grandifolium* Chois., *H. glandulosum* Ait., *Teucrium betonicum* Herit., *Globularia salicina* Lam., *Phyllis Nobla* L., *Lavandula viridis* Ait., *Viola odorata* L., *Fragaria vesca* L., *Agrimonia Eupatorium* L., *Lobelia urens* L., *Cynoglossum pictum* Ait., *Salvia clandestina* L., *Aristolochia longa* L., *Brachypodium pinnatum* Huds., *Melica ciliata* L., *Danthonia decumbens* L., *Arrhenatherum avenaceum* Beauv., *Agrostis canina* L., *Ceterach officinarum* Willd., &c.

3. Laurel and Heath.—Mountains; uncultivated, from 2500 to 5500 feet. The principal plants are—

Naturalized.—Common Broom and Mountain Ash (*Pyrus Aucuparia* L.); the latter perhaps indig.

Indig.—Laurels (*L. indica* L., *fœtens* Ait., *canariensis* Willd.), Heaths (*Erica arborea* L., *scoparia* L.), Whortleberry (*Vaccinium maderense* Link), *Clethra arborea* Ait., *Heberdenia excelsa* Ait., *Picconia excelsa* Ait., *Echium candicans* L. fil., *Sonchus squarrosus* DC., *S. pinnatus* Ait., *Chrysanthemum pinnatifidum* L. fil., *Cheiranthus mutabilis* Herit., *Senecio maderensis* DC., *Isoplexis sceptrum* L. fil., *Bystropogon punctatus* Herit., *piperitus* Lowe, *maderensis* Webb, *Teucrium abutiloides* Herit., *Mentha Pulegium* L., *Origanum virens* Hoffm., *Phyllis Nobla* L., *Fragaria vesca* L., *Viola sylvestris* Lam., *Saxifraga maderensis* Don, *Teesdalia nudicaulis* R. Br., *Sibthorpia peregrina* L., *Cedronella triphylla* Moench, &c.

4. Highest Peaks.—Rocky crags and summits of the higher mountains, uncultivated, from 5500 to about 6000 feet. The only peculiar plants are—

Indig.—*Arenaria serpyllifolia* L., *Cerastium tetrandrum* Curt., *Erica cinerea* L., *Viola paradoxa* Lowe, *Armeria maderensis* Lowe, *Avena marginata* Lowe.

Regions or Zones of Vegetation in Porto Santo.

1. Maritima or Littoral.—From the sea to a height of 100 feet; cultivated. The characteristic plants are—

Cult. and **naturalized.**—Vine, Fig, Mulberry, Tamarisk, *Elæagnus angustifolia* L., *Lycium europæum* L., *Arundo Donax* L., *Mesembrianthemum edule* L., &c.

Indig.—*Convolvulus Soldanella* L., *Salsola Kali* L., *Cakile maritima* Scop., *Pedrosia Porto-sanctana* Lowe, *Atriplex parvifolia* Lowe, *Sueda fruticosa* L., *Chenolea tomentosa* Lowe, *Glaucium corniculatum* L., *Polygonum maritimum* L., *Euphorbia piscatoria* Ait., *E. Peplis* L., *E. Paralias* L., *Spergularia rubra* L., &c.

2. Collina or Hill-side zone.—From 100 to 1200 feet; cultivated.

Cult.—Cereals (chiefly Barley and Rye), Pulse (*Ervum Lens* L., *Lathyrus Cicera* L., *L. articulatus* L.), White Poplar, Dragon-tree, Prickly Pear (*Opuntia Tuna* Mill.), Tamarisk, &c.

Indig. and **naturalized.**—*Ranunculus muricatus* L., *Erodium chium* L., *Frankenia pulverulenta* L., *F. lævis* L., *Astragalus Solandri* Lowe, *Senecio incrassatus* Lowe, *Statice ovalifolia* Poir., *Juncus acutus* L., *Pedrosia macrantha* Lowe, *Plantago Victorialis* Poir., *Cichorium Intybus* L. β. DC.; and amongst corn, *Chrysanthemum coronarium* L., *Silene inflata* Sm., *S. nocturna* L. β. DC., *S. ignobilis* Lowe, *Papaver Rhœas* L., *Centaurea melitensis* L., *Emex spinosus* L., *Melilotus parviflora* Desf., *M. sulcata* Desf., *Ononis mitissima* L., *Trifolii* sp., &c.

3. Montana or Mountain-pastures.—From 1000 or 1200 to 1500 feet; partially cultivated, but chiefly grassy.

Indig. or **naturalized.**—*Ononis micrantha* Lowe, *O. dentata* Lowe, *Medicago* sp., *Trifolium* sp., *Cynara horrida* Ait., *Verbascum virgatum* L., *Mentha Pulegium* L., *Origanum virens* Hoffm., *Prasium medium* β. Lowe, *Ajuga Iva* L., *Carex divulsa* Good., *Festuca bromoides* L., *Pteris aquilina* L., &c.

4. Excelsa or Rocky mountain-peaks.—From 1200 or 1500 to nearly 1700 feet; bare uncultivated highest crags.

Indig.—*Cheiranthus arbuscula* Lowe, *Umbilicus pendulinus* DC., *Sempervivum stellatum* Sm., *Saxifraga maderensis* Don, *Galium geminiflorum* Lowe, *G. anglicum* Huds., *Helichrysum melanophthalmum* Lowe, *Senecio maderensis* DC., *Pedrosia macrantha* Lowe, *P. argentea* Lowe, *Andryala robusta* Lowe, *Tolpis fruticosa* Schr. γ, δ. Lowe, *Erica scoparia* L., *Wahlenbergia lobelioides* L. fil., *Sibthorpia peregrina* L., *Micromeria varia* Benth., *Sideritis Massoniana* Benth., *Plantago leiopetala* Lowe, *Rumex aculeatus* L., *Habenaria cordata* Link, *Dactylis glomerata* L., *Davallia canariensis* Sw., *Polypodium vulgare* L., *Lycopodium denticulatum* L., &c.

Regions or Zones of Vegetation in the Dezertas.

N.D.—North or Little Flat Dezerta.

Maritime wholly.—Sea-cliffs, and top of the Island at or a little above 300 feet. The principal plants are—

Indig.—*Artemisia argentea* Herit., *Teucrium heterophyllum* Herit., *Olea europæa* L. *a*, subv. *buxifolia* Lowe, *Jasminum odoratissimum* L., *Silene inflata* Sm. *γ*, *maritima* With., *Matthiola maderensis* Lowe, *Crithmum maritimum* L., *Andryala robusta* Lowe, *Tolpis fruticosa* Schr. *a*, *Sonchus ustulatus* Lowe, *Calendula maderensis* Lowe, *Barkhausia divaricata β*. Lowe, *Helminthia echioides* Gaërtn., *Mesembrianthemum crystallinum* L., *M. nodiflorum* L., *Pedrosia glauca* Ait., *P. argentea* Lowe, *Vicia capreolata* Lowe, *Ononis dentata* Lowe, *Scrophularia arguta* Ait., *Plantago Coronopus* L., *Beta patula* Ait., *Suæda fruticosa* L., *Urtica urens* L., *Asphodelus fistulosus* L., *Hordeum murinum* L., *Brachypodium distachyon* L., *Arthrochortus loliaceus* Lowe, &c.

M.D. or G.D.—Middle or Great Dezerta.

1. Maritime.—Sea-cliffs, and up to a height of 800 or 1000 ft.

Indig.—*Monizia edulis* Lowe, *Crithmum maritimum* L., *Silene inflata* Sm. *γ*, *maritima* With., *Matthiola maderensis* Lowe, *Crambe fruticosa* Herit. *β*, *Phyllis Nobla* L., *Andryala robusta* Lowe, *Sonchus ustulatus* Lowe, *Tolpis fruticosa* Schr. *a*, *Calendula maderensis* Lowe, *Helichrysum melanophthalmum* Lowe, *Pedrosia glauca* Ait., *Plantago Coronopus* L., *P. arborescens* Poir., *Sideritis Massoniana* Benth. *β*, *Suæda fruticosa* L., &c.

2. Mountain.—Central Valley and Mountains, from 800 or 1000 to 1600 ft.

Cult. or naturalized.—A little Wheat and Rye, a few Firs (*Pinus Pinaster* L.), a Fig-tree or two, a few Cabbages, a Tobacco plant or two, Common Broom, Furze (*Ulex europæus* L.), Milk or Holy Thistle (*Silybum Marianum* Gaërtn.), *Arundo Donax* L., *Reseda Lutcola* L., *Papaver somniferum* L., &c.

Indig.—*Rapistrum rugosum* (L.) Bergm. *a.* and *β*, *Ruta bracteosa* DC., *Trifolium angustifolium* L., *T. lupulinum* L., *T. ligusticum* Balb., *Lotus hispidus* Desf., *Onobis mitissima* L., *Mesembriaathemum nodiflorum* L., *Asteriscus aquaticus* L., *Helaxinthia echioides* Gaërtn., *Galactites tomentosa* Mœnch., *Phagnalon saxatilis* L., *Echium plantagineum* L., *Marrubium vulgare* L., *Micromeria varia* Benth., *Rumex pulcher* L., *R. aculeatus* L., *Urtica urens* L., *U. membranacea* Poir., *Carex divulsa* Good., *Holcus lanatus* L., *Lagurus ovatus* L., *Phalaris cœrulescens* Desf., *P. paradoxa* L. fil., *Avena hirtula* Lag., *A. fatua* L., *Briza maxima* L., *Festuca bromoides* L., *Bromus madritensis* L., *Pteris aquilina* L., &c.

S.D.—South Dezerta or Bugio.

1. Maritime.—Sea-banks and cliffs up to a height of 1000 or 1200 ft.

Indig.—*Papaver somniferum* L., *Silene inflata* Sm. γ, *maritima* With., *Crambe fruticosa* Her. β, *Pedrosia glauca* Ait., *Melilotus parviflora* Desf., *Crithmum maritimum* L., *Phyllis Nobla* L., *Mesembrianthemum nodiflorum* L., *M. crystallinum* L., *Senecio incrassatus* Lowe, *Calendula maderensis* Lowe, *Tolpis fruticosa* Schr. α, *Andryala robusta* Lowe, *Echium nervosum* Ait., *Hyoscyamus canariensis* Ker, *Micromeria varia* Benth., *Plantago leiopetala* Lowe, *Rumex aculeatus* L., *Dactylis glomerata* L., *Avena hirtula* Lag., *Polypogon monspeliensis* Desf., *Gastridium australe* Beauv., *Asplenium marinum* L., &c.

2. Mountain.—Top of the Island, at or above 1200 or 1300 ft.

Indig.—*Silene gallica* L., *Spergularia fallax* Lowe, *Arenaria serpyllifolia* L. β, *Cerastium glomeratum* Thuill., *Erodium chium* L., *Ononis dentata* Lowe β, *Pedrosia argentea* Lowe, *Aizoon canariense* L., *Galium murale* L., *Phagnalon saxatile* L., *Chrysanthemum hæmatomma* Lowe, *Carlovizia salicifolia* Less. β, *Centaurea melitensis* L., *Silybum Marianum* Gaërtn., *Helminthia echioides* Gaërtn., *Barkhausia divaricata* β. Lowe, *Heliotropium europæum* L., *Scrophularia arguta* Ait., *Sideritis Massoniana* Benth. β, *Anagallis arvensis* L. β, *Urtica urens* L., *Hordeum murinum* L., *Festuca bromoides* L., *Lagurus ovatus* L., &c.

Localities or Habitats.

Mad..... Madeira.
PS. ..... Porto Santo.
ND. ..... North or Flat Dezerta; "*Ilheo Chaõ.*"
MD. or GD .. Middle or Great Dezerta; "*a Dezerta.*"
SD. ..... South Dezerta; "*Bugio.*"
reg. ..... Region or Zone in each of these.

When any of these habitats are specified, the plant must be understood not to have been discovered in the rest.

When none are mentioned, the plant has been observed in all.

Rarity or Abundance.

rr.—*Extremely rare.* In one or two spots only. E.G. *Ranunculus acris* L., *Viola paradoxa* Lowe, *Visnea Mocanera* L. fil., *Pittosporum coriaceum* Ait., *Goodyera macrophylla* Lowe, *Luzula Seuberti* Lowe, *Festuca jubata* Lowe, *Lycopodium complanatum* L., &c.

rr.—*Very rare.* In several spots, but only sparingly, a few detached plants here and there. E.G. Yew, Cedar of the island (*Juniperus Oxycedrus* L.) and *J. phœnicea* L., Dragon-tree, *Picconia excelsa* Ait., *Rhamnus glandulosa* Ait., *Vicia capreolata* Lowe, *Convolvulus Massoni* Dietr., *Anthyllis Lemanniana* Lowe, *Musschia Wollastoni* Lowe, *Melanoselinum decipiens* Hoffm., *Nyctcrium triphyllum* Lowe, *Balantium culcita* Sw., &c.

r.—*Rare.* In a few spots only, and in those tolerably abundant; but quite local. E.G. Daisy, Dandelion, *Musschia aurea* Ait., *Erica cinerea* L., *Avena marginata* Lowe, *Polypodium drepanum* Sw., *Nothochlæna vellea* Ait., &c.

$\frac{r}{2}$.—*Rather rare.* In several spots, or a whole district, and in such abundantly; but still local. E.G. *Laurus Barbusana* Lowe, *Ranunculus creticus* L. β, *Frankenia lævis* L., *Hypericum linarifolium* Vahl, *Sambucus maderensis* Lowe, *Sedum farinosum* Lowe, *Thymus angustifolius* Pers., *Salvia clandestina* L., *Nephrodium Oreopteris* Ehrh., &c.

$\frac{c}{2}$.—*Rather common.* In many places, but confined to one Region only, and not very abundant. E.G. *Heberdenia excelsa* Ait. (Aderno), *Ranunculus creticus* L. α, *R. muricatus* L., *Cheiranthus mutabilis* Her., *Sideroxylon Mermulana* Lowe, *Cheilanthes suaveolens* Sw., &c.

c.—*Common.* General everywhere in two or more Regions, but nowhere very abundant. E.G. *Nigella damascena* L., *Delphinium Consolida* L., *Papaver somniferum* L., *Capsella Bursa Pastoris* L., *Trifolium repens* L., *Cichorium Intybus* L. β, *Gnaphalium luteo-album* L., *Scandix Pecten Veneris* L., &c.

cc.—*Very common.* General and abundant, but mostly confined to one Region only. E.G. *Matthiola maderensis* Lowe, *Opuntia Tuna* Mill. (Prickly Pear), *Helichrysum obconicum* DC., *Andryala robusta* Lowe, *Tolpis macrorhiza* Lowe, *Vaccinium maderense* Link, *Erica arborea* L., *Festuca Donax* Lowe, *Deschampsia argentea* Lowe, *Woodwardia radicans* Sw., &c.

ccc.—*Extremely common.* General and abundant everywhere, and in two or more Regions. E.G. *Ranunculus repens* L., *Fumaria muralis* Sond., *Isatis præcox* Kit., *Hypericum perforatum* L., Common Broom, Bramble, *Psoralea bituminosa* L., *Vicia conspicua* Lowe, *Ammi majus* L., *Calendula arvensis* L., *Echium plantagineum* L., *Solanum nigrum* L., *Antirrhinum Orontium* L., *Sibthorpia peregrina* L., *Origanum virens* Link, *Laurus canariensis* Willd., *L. fœtens* Ait., *L. indica* L., *Rumex maderensis* Lowe, *Carex divulsa* Good., *Lolium perenne* L., *Festuca bromoides* L., *Briza maxima* L.,

Poa annua L., *Holcus lanatus* L., *Lycopodium denticulatum* L., *Polypodium vulgare* L., *Pteris aquilina* L., *Davallia canariensis* L., &c.

Nature and Duration.

Herb. ..... Herbaceous.
Shr. ..... Shrub.
Suffr. ..... Do. under a foot high.
Tr. ..... Tree.
Ann. ..... Annual.
Bien. ..... Biennial.
Per. ..... Perennial.

Seasons.

Spr. .... Spring, *i. e.* Nov. Dec. Jan. Febr. Mar. Apr. May.
Sum. .. Summer, *i. e.* June, July, Aug.
Aut. .. Autumn, *i. e.* Sept. Oct. Nov. Dec.

Terms of Description.

ach. ..... achænia.
anth. ..... anthers.
br. ..... bracts.
caps. ..... capsule.
carp. ..... carpels.
cor. ..... corolla.
fil. ..... filaments.
fl. ..... flower.
fr. ..... fruit.
ft. ..... feet.
in. ..... inches.
inv. ..... involucre.
L. l. ..... leaves.
lfts. ..... leaflets.
l. c. ..... loco citato ; *i. e.* in the place last quoted.
ov. ..... ovary.
ovul. ..... ovules.
pan. ..... panicle.
ped. ..... peduncle.
pedic. ..... pedicel.
pet. ..... petals.
pl. ..... plant.
rac. ..... raceme.
recept. ..... receptacle.
sds. ..... seeds.
segm. ..... segments.
sep. ..... sepals.
sp. ..... species.
spec. ..... specimen.
st. ..... stem.
stam. ..... stamens.
stip. ..... stipules.
var. ..... variety.

Pubescence.

1. *Hairs soft.*

pubescent .. downy with short fine hairs.
puberulous .. downy in lowest degree.
pilose ..... hairy, with long distinct hairs.
villous ..... hairy, with copious long close-set hairs.
lanuginous .. woolly.
tomentose .. cottony.

floccose .... woolly or cottony, separating into loose locks.
velutinous .. velvety.
sericeous .... silky.
furry ..... clothed with short crisped or irregularly crumpled pubescence.

2. *Hairs hard or stiff.*

hispid ..... rough, with short coarse hairs.
hispidulous .. rough in lowest degree.
hirtose..... sprinkled with long distinct hairs.
hirsute..... shaggy, with copious long close-set hairs.
strigose .... harsh, with rather short distinct very hard stiff hairs, often springing from a bulb or tubercle. (Extreme of *hispid.*)
setose ..... bristly, with copious long close-set very stiff hairs. (Extreme of *hirsute.*)

Direction of Stems.

creeping .... lying flat along the ground, and rooting here and there.
prostrate .... lying flat along the ground, but not rooting.
procumbent.. lying partly flat, the ends ascending: less of *prostrate.*
ascending .. a little prostrate at the base; then, and for the greater part of their length, upright.
decumbent .. rising obliquely from the base, but falling back upon the ground.
diffuse ..... spreading loosely irregularly from the base, but not falling back upon the ground: less of *decumbent.*
climbing .... trailing or laying hold in various ways, but not themselves twining.
twining .... twisting or winding spirally.

Colour of Flowers.

w.	white.	or.	orange.
l.	lilac.	sc.	scarlet.
v.	violet.	cr.	crimson.
b.	blue.	r.	red.
gr.	green.	p.	pink.
y.	yellow.		

Degree of Naturalization.

†.—Quite naturalized or self-propagating, but *probably* introduced originally: e.g. Prickly Pear (*Opuntia Tuna* Mill.), Broom, Bramble, Bella Donna Lily, Star of Bethlehem (*Ornithogalum arabicum* L.), *Oxalis corniculata* L., *Bidens*

leucantha Willd., *Gladiolus segetum* Ker, *Panicum repens* L., &c.

††.—More or less naturalized or self-propagating and growing without culture, but *certainly* introduced originally: *e. g.* Cape Gooseberry (*Physalis edulis* Sims), *Nicandra physalodes* Gaërtn., *Ageratum conyzoides* L., *Eclipta prostrata* L., *Eupatorium adenophorum* Spr., *Passiflora cærulea* L., *Cassia bicapsularis* L., *Pelargonium inquinans* L., *Lantana Camara* L., *Oxalis purpurea* Jacq., *Commelyna communis* L., *Colocasia antiquorum* Sch. (Inhame), *Richardia æthiopica* L., *Arundo Donax* L., Maurandia, Aloe, Agave, Castor-Oil plant, Common Furze, Pomegranate, &c.

†††.—Subnaturalized or perfectly acclimatized, but not self-propagating, and growing not without some slight culture, or chiefly as a crop or common ornamental plant: *e. g.* Chestnut, Oak, Plane, Acacia, Robinia, Brugmansia, Fuchsia, Pelargonium, Heliotrope, Peach, Fig, Apricot, Quince, Mulberry, Flax, Wheat, Rye, Barley, Orange, Lemon, Plum, Cherry, Vine, Guava, Rosemary, Buddlæa, Rose-apple, Lupines, French Beans, Gourds, Pumpkins, Onions, Cabbage, &c.

N.B. When no mark at all is prefixed, the plant is considered to be certainly or probably indigenous.

Books or Authors, etc. most frequently quoted.

L. ..... Linnæus.
W. ..... Willdenow.
DC. ..... DeCandolle, Prodromus.
EB. ..... English Botany.
EBS. ..... English Botany Supplement.
RIB. ..... Reichenbach's Icon. Botan. s. Plantæ Criticæ.
RFG. ..... Reichenbach's Icon. Floræ Germanicæ et Helvet. s. Fl. Germ. Excurs.
BM. ..... Curtis's Botanical Magazine.
BH. ..... Banksian Herbarium at the British Museum.
HH. ..... Hookerian Herbarium at Kew.
Sm. E. Fl. .. Smith's English Flora.
H. Fl. Sc. .. Hooker's Flora Scotica.
Brot. ..... Brotero's Flora Lusitanica.
Desf. ..... Desfontaines' Flora Atlantica.
WB. ..... Webb and Berthelot's Phytographia Canariensis.
Presl ..... Presl's Flora Sicula, Pragæ 1826.
Koch ..... Koch's Synopsis Fl. Germ. Ed. 2. Lips. 1843–45.
Bab. ..... Babington's Manual of British Botany, Edit. 4. 1856.
Buch ..... Von Buch's List of Madeira Plants in "Abhandlungen der Königl. Akademie der Wissen-

schaften zu Berlin, &c., für das Jahr 1816;" afterwards published in a Collection of Memoirs, 4to, Berlin, 1825.

Holl ..... A List of Plants observed in the Island of Madeira, with descriptions (by Reichenbach in the Phanerogamous Plants, and Kunze in the Cryptogamous) of some new species. By Fr. Holl, Dresden. Published in the Ratisbon Flora, Regensburg, 1830; and reprinted, with "Notes and Observations on the above list, &c., by R. T. Lowe," in Hook. Journ. of Bot. (Bot. Misc. 2nd Ser.) vol. i. Lond. 1834.

Prim., Novit. Lowe's Primitiæ, Camb. 1830; Novitiæ, Camb. 1838; and Lond. 1851.

Altitudes of the principal mountains, stations or localities specified in the following pages (from Vidal's Survey chiefly).

Madeira.	Feet
Pico Ruivo	6056
„ dos Arrieiros . .	5893
„ Grande	5391
„ Ruivo on the Paul da Serra . . .	5210
Travellers' house on do.	4608
Pico do Arrebentaõ . .	3844
Mr. Veitch's house at the Jardim da Serra.	2526
Mount Church . . .	1965
Cabo Giraõ	1934
Penha d'Aguia . . .	1915
Brazen Head	421
Encumeado de S. Vicente, about . . .	4000
Levada in Rib. Frio and Rib. da Metade, about	3000
Church at Camacha and at S. Antonio da Serra, about.	2300
Church in the Curral das Freiras, about . . .	2000
Palheiro, about . . .	2000
Hotel at S^{ta} Anna, about	1100
Levada de S^{ta} Luzia,	from 500 to 600
Quinta do Valle, about	350
Deanery, about . . .	300

Porto Santo.	Feet
Pico de Facho . . .	1663
„ do Castello . . .	1446
„ Branco	1389
„ d'Anna Ferreira .	911
Ilheo de Baxo . . .	570
„ de Cima . . .	364

Dezertas.	
Dez. Grande	1610
Bugio	1349
Ilheo Chaõ	336
Sail-rock, off N. end of I. Chaõ	160

Lat. of Funchal—
32° 38′ 22″ N
Long. . . . 16° 54′ 56″ W.

Lat. of Porto Santo—
33° 3′ 30″ N.
Long. . . . 16° 20′ 14″ W.

Mean annual temperature of Funchal, 65°–67° Fahr.

A

MANUAL FLORA

OF

MADEIRA

AND THE ADJACENT ISLANDS.

I. VASCULAR PLANTS.

Leaf-bearing plants, composed of cellular tissue, woody fibre and spiral vessels. Epiderm with stomata. Seeds with a distinct germ (gemmule or plumule and radicle) and one or more seed-leaves (cotyledons).

Class I. EXOGENS OR DICOTYLEDONS.

Flowering plants, with stems composed of bark, wood and pith (*medulla*): the wood interrupted by medullary rays (*silver grain* of carpenters) and growing by accretion of fresh concentric rings or layers outside. Leaves with generally branched reticulating veins. Flowers distinct symmetrical antheriferous. Cotyledons two opposite, or rarely several whorled, very rarely (in a few exceptionally leafless plants, *e. g. Cuscuta* L.) none.

Subclass I. THALAMIFLORÆ.

Stam. free or distinct from the pet., and with the latter inserted separately from the sep. on the summit of the flower-stalk (*receptacle, thalamus* or *torus*) below the ovary (*i. e.* hypogynous).

Order I. RANUNCULACEÆ.

The Ranunculus Family.

Sep. 3–6, often 5, mostly deciduous. Pet. 5 or more, sometimes peculiarly shaped, sometimes with a gland or scale inside at the base, rarely 0. Stam. indefinite in number, free, hypogynous: anthers adnate, bursting longitudinally mostly outwards. Ov. 1–many, distinct, each with a style and 1–many ovules affixed to the inner suture. Fruit various, dry (achænidal or follicular), or (rarely) baccate. Carpels 1–many-seeded. Seeds erect or pendulous; embryo minute in a hollow of the horny albumen.—Herbaceous rarely shrubby with watery acrid often poisonous juices. Leaves mostly much divided, with dilated sheathing stalks, but no true stipules. Hairs when present simple.

Tribe I. *RANUNCULEÆ.*

The Ranunculus Tribe.

Æstivation imbricate. Pet. with a nectariferous pore at the base. Anthers bursting outwards (*extrorsal*). Ov. many distinct, each with one ovule. Fr. a collection of many dry 1-seeded achænia. Seed erect except in *Myosurus*.

1. Ranunculus. Sep. 5, rarely 3, deciduous. Pet. 5, rarely many; nectariferous pore at the base of their claw either naked or covered by a scale. Ach. numerous, collected into a globular or oblong head.

Tribe II. *HELLEBOREÆ.*

The Hellebore Tribe.

Æstivation imbricate. Sep. 5, rarely more, petal-like. Pet. irregular or peculiar in form, or 0. Anthers extrorsal. Fr. consisting of one or several distinct or more or less combined many-seeded follicles, each bursting inwards.

2. Nigella. Sep. 5 petal-like deciduous. Pet. 5–10 smaller than the sepals, 2-lipped, their claw with a nectariferous pore covered with a scale. Follicles 5–10 more or less connate or combined into a capsule, each beaked with the long horn-like persistent style.

†3. AQUILEGIA. Sep. 5 petal-like deciduous. Pet. 5, 2-lipped funnel-shaped produced downwards between the sepals into a long hollow horn-like spur. Follicles 5 distinct, each acuminate and tipped with the style.

4. DELPHINIUM. Sep. 5 petal-like deciduous irregular or unequal, the uppermost being produced downwards into a long spur. Pet. 4, the 2 upper each with spurs enclosed within the sepal-spur, or all combined into a monopetalous single-spurred cor. Follicles 1, 3 or 5, distinct.

Tribe I. *Ranunculeæ.*

1. RANUNCULUS L.

Crowfoot or Butter-cup.

* Leaves divided. Fl. y. Nectary with a scale. Ach. compressed, lenticular, marginate, *even, unarmed.*

† Root fascicled or grumose.

1. R. GRANDIFOLIUS Lowe. *Douradinha* or *Ouradinha.*

Hairy pubescent sometimes villose, hairs soft and silky, *all quite simple at the base, those of the stem close-pressed*; st. stout erect branched corymbose; l. light gr. unspotted shining somewhat harsh or stiff, the lower stem and root-leaves roundish-reniform or cordate, undivided and obtusely pinnatilobate, rarely pinnatipartite or more deeply cut and gashed, *the edges always sharply and finely or copiously cut and toothed*; upper st.-leaves 3–5-pinnatipartite, the uppermost sessile simple lanceolate entire; *fl. in a close crowded corymb, large*; sep. spreading horizontally; *heads of fr. short obtuse globosely oval,* sometimes inclining to oblong, rarely oblong; ach. quite smooth with a hooked beak.—Herb. per. Mad. reg. 3; $\frac{c}{2}$. Ravines and thickets on wet rocks and banks. Apr.–July.—Root large, often in *α.* palmate with fleshy thick divisions, and in *β.* tomentose. Fl. bright y. large and handsome, 1–2½ inches in diam. densely corymbose. Recept. slightly villose at the base.—Var.:

α. major; st. robust 2–4 ft. high; root-l. very large from 5–12 in. broad, scarcely divided with obtuse broad shallow lobes; corymb very large and ample many-flowered; fl. very large; fruit-spikes short and oval.—*R. grandifolius* Lowe Prim. (Ed. 1. 1830) 38! not Meyer; Walp. Repert. 1. 36; Hook. J. of Bot. 9. 70. *R. creticus* Prim. (Ed. 2. 1851) App. V. VI.! not Linn. *R. arcticus* (misprint for *creticus*) Buch Verz. 195. *R. cortusæfolius β. sylvaticus* WB. i. 8, 9? *R. cortusæfolius β. sylvaticus* Seub. Fl. Az. 42. *R. cortusæfolius* Hook. in Bot. Mag. t. 4625! (hairs too

spreading; descr. in part only) not Willd. *R. megaphyllus* Steud.—Ledges and clefts of wet or shady rocks, especially near waterfalls, in ravines everywhere above 3000 ft., c. Rib. Frio, Rib. da Metade, de Seisal, de Janella, Serra d'Agoa, Boa Ventura, &c. A noble pl., gigantic in its genus, conspicuous on high rocks with its broad ample shining l. and vast corymbs of fine golden y. fl. often as large as a crownpiece or dollar.

β. *minor*; altogether smaller and usually more villose-hairy than α, with the lower or root-l. pinnatipartite or more deeply cut and divided than in α, and only 2–4 in. broad; st. 1–2 ft. high; corymb of fewer generally smaller fl., and fruit-spikes sometimes distinctly oblong.—Hook. J. of Bot. 9. 72. *R. creticus* var. *macrophyllus* Lindl. Bot. Reg. t. 1432.—Moist open grassy banks, and thickets of *Vaccinium*, r. Paul da Serra, and close below the waterfall at the head of the Rib. de S^ta^ Luzia.—A starved or depauperated form of α, sometimes almost hoary-villose.

For a fuller account of *R. grandifolius* and its nearest allies *R. creticus* L. and *cortusæfolius* Willd., with one or both of which it has been usually united, see a Paper in Hook. Journ. of Bot. ix. 65. The Cretan pl. is on the whole rather more nearly related to the Canarian than to the Madeiran or Azorian sp., ranking intermediately according to affinity between the two, instead of coming in the order of its geographical position.

Nothing like the true Canarian *R. cortusæfolius* Willd. (Deless. Ic. 1. t. 36, opt.) has occurred in Madeira to myself or to any other botanist of my acquaintance. But in the BH. the hab. "Madeira, Fr. Masson" is affixed to an undoubted specimen of the pl. with its characteristic smaller thinner sparingly crenate black-specked l. sprinkled with bulbous hairs, its smaller scattered not corymbosely crowded fl. on slender elongated stalks, and altogether more delicate habit. Masson however having collected in Teneriffe immediately after Madeira, a mistake might easily arise from accidental transposition of his specimens or labels.

†† *Root fibrous.*

††2. R. ACRIS L. **Tall upright Crowfoot.**

More or less hairy; *st. erect branched many-flowered*; l. palmately 3–5-partite, the segments trifid deeply and sharply cut and toothed; upper st.-l. tripartite with linear segments; *pedic. round*; *sep.* pubescent *spreading*; ach. oval smooth marginate with a very short slightly hooked beak; *recept. smooth.*—Brot.

ii. 367; EB. t. 652; DC. 1. 36; Sm. E. Fl. iii. 51; Presl 16; Koch 18; Bab. 10.—Herb. per. Mad. reg. 2; rrr. Palheiro, chestnut woods by the road outside, and in fields inside, the Park, whence it has evidently straggled. Up the Caminho do Meio, S^{r} J. M. Moniz. Apr.–June.—St. stout hollow branched 2–3 ft. high. Fl. bright y. Sep. erecto-patent, not reflexed. Beak about $\frac{1}{4}$ the length of ach.

3. R. REPENS L.

Hairy pubescent; *st. suberect few-flowered with long creeping stolons*; root-l. ternate and biternate, leaflets trifid cut and toothed; *pedic. furrowed*; sep. pubescent *spreading*; ach. oval smooth marginate *finely punctate*, with a rather long slightly hooked beak; *recept. hairy.*—Brot. ii. 366; DC. i. 38; EB. t. 516; Sm. E. Fl. iii. 51, 52; Presl 17; Koch 19; Bab. 10.—Herb. per. Mad. reg. 1, 2, 3; ccc. All the year. Moist grassy places everywhere.—St. (primary) erect 6–12 in. high. Side-shoots widely spreading prostrate and rooting. L. dark gr. often spotted or blotched with darker. Fl. bright y.

** Leaves divided. Fl. y. Nectary with a scale. Ach. compressed lenticular marginate *rugose tubercular or muricate.* Root fibrous.

4. R. TRILOBUS Desf.

Smooth or nearly so; *st. erect subrobust and firm much branched*; *root-l. roundish undivided crenate*, the rest 3-partite with the segments wedgeshaped cut and toothed; *pedic. opposite the l.* furrowed; sep. reflexed; pet. subabortive 3–4, rarely 5, oblong scarcely or not longer than the sep.; disk of ach. *bluntly warted or tuberculated all over.*—Desf. 1. 437. t. 113; DC. 1. 42; Presl 19; WB.! i. 10 (excl. var. β. *rhœadifolius*).—Herb. ann. Mad. reg. 1, 2; r. May, June.—St. 12–15 in. high branched from the base, stout and upright, more or less erect; herbage pale gr. Fl. small inconspicuous pale y. Ach. with a broad short curved beak, the smooth broadish rim or margin remaining gr. longer than the bluntly granulated disk, which soon turns tawny brown. The whole pl. is of very short duration.—Var.:

α. *glabra*; nearly or quite smooth.—Var. α. *Fontanesii* WB.! l. c.—Ascent out of the Cayadas Ravine beyond Camacha, wet places by the roadside. Maxico, wet ditches and places on the beach.

β. *subpilosa*; st. l. and sep. more or less hairy; st. somewhat spreading or diffuse.—Borders of cornfields by the road between S. Vicente and the Encomiado, in drier situations than α.

Bourgeau's specimens from Grand Canary in the BH.

ticketed *R. trilobus* Desf., cannot be distinguished from his Teneriffe specimens of the true *R. parviflorus* L.—The HH. contains however true Canarian specimens from Webb of *R. trilobus* *a*, with Azorian also of both *a*. and *β*.

No such pl. has occurred in Madeira as *R. rhœadifolius* DC. Deless. Ic. 1. t. 40, which also, by specimens in HH., appears distinct enough, with its much more hairy and divided Escholtzia-like l., from the present sp., to which it is referred by Webb and Walpers.

5. R. PARVIFLORUS L.

Hairy-pubescent; *st. prostrate or procumbent weak and slender almost filiform* branched here and there only; l. all trifid, their lobes or segments wedge-shaped, in the upper deeply cut or toothed; pedic. opposite the l. remote all along the st.; *sep. reflexed* pubescent; *pet. subabortive* 3–4 *oblong not longer than the sep.*; *disk of ach. all over thickly echinulate with hooked or pointed tubercles.*—Desf. 1. 441; Brot. ii. 371; EB. t. 120; DC. 1. 42; Sm. E. Fl. iii. 53; WB.! i. 11; Bab. 11.

β. acutilobus DC. WB. l. c.; l. more deeply 3-cleft, the segments deeply cut with large acute teeth.—Herb. ann. Mad. reg. 1, 2; r. Gutters in Machico, and descent into Rib. Frio in the road. May–July.—St. 6–10 in. long, weak and trailing or diffusely spreading horizontally, their ends ascending. Fl. inconspicuous small pale y. Ach. few (8–10) in a head, rather large proportionately to the pl.; their margin very narrow; tubercles of the disk tipped each with a short hooked weak or bristly point. Beak short curved hooked at the tip. Recept. smooth.

6. R. MURICATUS L.

Smooth or with only a few scattered hairs, shining; st. robust and firm, at first erect, *soon diffuse or spreading stiffly*, much branched from the base; *lower l. round or reniform* 3-*lobed coarsely inciso-crenate*, upper trifid wedge-shaped at the base; pedic. opposite the l. slightly hirtose; sep. slightly hirtose spreading; pet. ovate-oblong small not longer than the sep.; *disk of ach. all over prickly with long-beaked hooked or pointed tubercles*, the margin unarmed even.—Desf. 1. 440; Brot. ii. 373; DC. 1. 42; Presl 19; WB.! i. 9, 10; Koch 20.—Herb. ann. Mad. reg. 1, 2; c. PS. reg. 1; r. Gutters and wet places by roadsides about Funchal, and in PS. about the large tank halfway across the island. March, Apr. principally, but irregularly throughout the year.—Herbage pale gr. very shining. St. 4–8 or 10 in. high, short stiff thick and hollow. Fl. small bright y. Ach. broadly margined, their beak in the specimens short broad slightly curved and hooked at the tip.

Tribe II. *Helleboreæ.*

2. Nigella L.

1. N. damascena L.

Anthers awnless; carpels 5, even, 2-celled, connected quite to their tips into an ovate-globose capsule; floral inv. cleft like the l. into many capillary segments; sep. spreading; seeds triangular transversely rugose.—BM. t. 22; Desf. 1. 428; Brot. ii. 334; DC. 1. 49; Presl 25; WB. i. 3; Koch 22.—Herb. ann. Mad. reg. 1, 2; c. Cornfields and waste ground, general. Irregularly throughout the year.—Nearly or quite smooth. St. erect sparingly branched; branches 6–12 in. long spreading or diffuse. L. dark gr. finely divided like Fennel: their segments flat linear acuminate. Fl. bluish or grey.—The "Fitches" (Ketzach, Hebr.) Is. xxviii. 25, 27, was probably the seed of an allied sp., *N. sativa* L., used, like Aniseed, Caraway or Coriander-seed, to flavour cakes or bread.

3. Aquilegia L.

Columbine.

†1. A. vulgaris L.

Spur of pet. incurved hooked at the tip, their limb very obtuse shorter than the stam.; sep. oblong-ovate; l. twice ternate, leaflets 3-lobed crenate.—Brot. ii. 333; EB. t. 297; DC. 1. 50; Sm. E. Fl. iii. 33; Presl 24; WB. i. 4; Koch 23; Bab. 12.—Herb. per. Mad. reg. 2; r. Rib. de S^{ta} Luzia, especially opposite the Chaõ dos Tornos. May, June.—St. 2–3 ft. high and with the petioles, pedic. and follicles or carpels subglandulose-pubescent; l. slightly pub. and whitish or glaucous beneath, quite smooth above. Fl. pendulous large, dark bluish-violet.

4. Delphinium L.

Larkspur.

* *Consolida* DC. Ov. 1. Pet. 4 united into a 1-petalous cor.; spur internal 1-petalous.

1. D. Consolida L. **Branching Larkspur.**

More or less pubescent sparingly branched, branches forked spreading lax and straggling, fl. few together in short lax terminal rac., pedic. as long as or longer than the br.; follicles rather short smooth or pubescent.—Linn.! Herb.; Syst. (Ed. 12) ii. 370; Clus. Rar. Pl. Hist. p. ccvii; Fl. Dan. t. 683; Brot. 2. 302; DC. Syst. 1. 343; Prod. 1. 51; Koch 24; RFG. 3. t. 66. f. 4669.

β. *pubescens*; st. l. and follicles pubescent.—WB. 1. 5. *D. Consolida* EB. t. 1839; Sm. E. Fl. iii. 30; Bab. 12.—Herb. ann. Mad. reg. 1, 2; c. Cornfields everywhere; PS. r. Apr.–Sept.

—St. 12–18 in. high stiff leafy finely and closely pubescent; branches more than once forked remote few slender lax and widely straggling ending in short lax few-flowered racemes 3 or 4 in. long. L. sessile deeply multifid with narrow linear acute segm. Fl. rather distant about 3–5 in each rac. large deep violet-blue; pedic. often scarcely longer than and never more than twice the length of the bracts. Follicles always (in Mad.) pubescent 4–6 or 8 lines long. DC. and Koch l. c. describe the caps. as smooth; and Brotero says the germen is so sometimes. I have never seen them, either in Herb. or in the living pl., otherwise than pubescent. They are unfortunately wanting in the Linn. type.

D. Ajacis L.! with straight stiff erect virgate st. either simple or with few short simple stiff erect side-branches, with long closely and many-fld. rac. and always pubescent larger follicles, 8–10 or nearly 12 lines long, which is the origin of the common garden double-fld. Rocket Larkspur of so many varieties of colour, pink, lilac, purple, lavender, &c. and white, and of which *D. Consolida* Fl. Gr. t. 504, referred by DC. to his *D. pubescens*, seems to represent, as remarked already by Fischer and Meyer (Animadv. Bot.), a more than usually branched luxuriant state of the single-fld. wild pl., is not found in Mad. except in gardens.

** *Delphinellum* DC. Ov. 3; 2 lower pet. distinct or free and beardless; cor.-spur internal 1–2-petalous.

2. D. PEREGRINUM L.

Smooth or nearly so; st. erect branched leafy; branches rather numerous slender twiggy straight and stiff erect or erecto-patent; l. 3-partite many-cleft, segm. of the upper l. and br. long linear acute, of the lower broader and less divided; fl. in short somewhat crowded rac., the 2 lower pet. stalked, their limb orbicular or squarish, cordate at the base; cal.-spur pubescent slender ascending or erect; cor.-spur 2-petalous.—Linn.! Herb.; Syst. Nat. (Ed. 12) ii. 371. *D. peregrinum* L. γ. *elongatum* Boiss.! in Hll.; Walp. Repert. 1. 51. *D. cardiopetalum* DC. Syst. 1. 347; Prodr. 1. 52.—Herb. ann. Mad. reg. 2; r. Cornfields a little below the Allegria Chapel above S. Roque near Funchal. June–Aug.—Size of the preceding but more slender branched and leafy with more numerous upright virgate branches and smaller more crowded paler b. fl., whitish and elegantly striped outside in the bud. Rachis of rac., pedic., br., sep., spur and ovary minutely downy; the rest smooth. Limb of the 2 lower pet. squarish-orbicular, as broad as long, notched at top, distinctly cordate at the base. Follicles 3, sometimes 5, subpubescent or sparingly downy, 4 or 5 lines long.

It is difficult to account for DC.'s very express reference (Syst. 1. 348) of *D. peregrinum* L. ("ex herb. suo") to his *D. junceum* rather than to his *D. cardiopetalum*; for certainly the specimen preserved in the Linn. Herb. has the limb of the 2 lower stalked or stipitate pet. plainly squarish-"orbicular and cordate at the base," instead of "elliptic or obovate" as it is in *D. junceum* DC. and in *D. peregrinum* RFG. iii. t. 68. f. 4672; which, with perhaps *D. peregrinum* Fl. Gr. t. 506 and Desf. 1. 426, differ notably in this respect from the Linnæan type.

Order II. BERBERIDACEÆ.

The Barberry Family.

Sep. 3, 4 or 6 in a double row, deciduous. Pet. the same (rarely double) in number, opposite the sep., with glands at their base. Stam. opposite the pet. Anth. adnate, bursting by valves from the bottom to the top. Ov. 1, 1-celled. Fr. baccate or capsular indehiscent. Seeds attached to the base of the unilateral placenta. Embryo straight axile.—Shr. or herbs with bristle-serrate or spinulose-serrate compound or by abortion or suppression simple alternate exstipulate l., and acid bitter juices.

1. BERBERIS. Sep. 6, with 3 coloured scale-like br. outside. Pet. 6, each with 2 glands inside at the base. Berry 2-(rarely 3-) seeded.—Shr. often thorny and with fasciculate simple l.; fl. y. generally in racemes; juices, especially of the berries, acid and astringent.

1. BERBERIS L.

1. B. MADERENSIS Lowe. *Ameixeira d'espinho.*

Spines 3-partite; l. simple subspathulate or bluntly oblong-lanceolate and attenuated downwards, somewhat stiff and coriaceous, very entire, reticulated with pale veins and slightly marginate; racemes erecto-patent rather short and few-(6–8) fld., fl. globose.—Shr. Mad. reg. 3; rr or rrr. High rocks in ravines. Brink of the upper part of the Rib. da Metade at a place called the "Agoa de Bica," on the way from the Fonte das Moças to Pico dos Arrieros. Canhas, J. M. Moniz. May, June.—A low shr. from 3 to 5 feet high, with several arching st. about the thickness of the wrist or arm downwards; the ultimate branches strongly striated or ribbed and of a bright rich or. or or.-chestnut colour. L. few or remote and rather small in proportion, fasciculate, slightly pointed or blunt with a minute mucro; from 1–1½ in. long and from ¼–½ in. broad; their taste very bitter as well as astringently subacid. Racemes scarcely longer than the l. Fl. a little larger and more globose than in *B. vul-*

garis L., to which it is indeed less nearly allied than to *B. cretica* L.; having also some resemblance in its thin scant foliage and subspathulate entire l. to *Lycium europæum* L. as it grows wild in Madeira. Fr. partly y. and red, much shorter and thicker with a larger more tumid style than in *B. vulgaris* L.

The bright y. wood is employed in ornamental work by the Funchal cabinet-makers, and is called by them *Fustete*.

Order III. PAPAVERACEÆ.

The Poppy Family.

Sep. 2 deciduous. Pet. generally 4 cruciate regular. Stam. hypogynous free generally many. Ov. single; styles short or 0; stigmas 2, or many, radiating sessile. Ovules many. Fr. unilocular, either podshaped with 2 or capsular with several parietal placentas, many-seeded.—Pl. with exstipulate generally compoundly divided l., long 1-flowered ped., and narcotic milky or coloured juices. Pet. folded and crumpled in the bud, fugacious.

* *Seeds not crested.*

1. PAPAVER. Pet. 4. Stam. many. Style 0. Stigmas 4–20 radiating, sessile on or combined into a radiated peltate disk crowning the ov. Caps. obovate incompletely 4–20-celled, opening by slits or pores beneath the stigmas. —Fl.-buds cernuous. Juices white milky.

2. GLAUCIUM. Pet. 4. Stam. many. Stigmas 2 sessile. Caps. long narrow podshaped 2-valved bursting from the top downwards. Seeds imbedded in a spongy intervalvular dissepiment connecting the placentas.—Juices yellow or orange.

** *Seeds crested.*

†3. CHELIDONIUM. Pet. 4. Stam. many. Stigmas 2. Caps. narrow podshaped 1-celled 2-valved bursting from the base upwards. Seeds crested attached to the 2 intervalvular distinct placentas. Juices orange.

1. PAPAVER L.

Poppy.

* *Filaments subulate, capsule smooth.*

1. P. RHŒAS L. **Common Red or Corn Poppy.** *Papoula* or *Papoila.*

Hispid-pilose; l. 1–2-pinnatipartite, their segments oblong-lanceolate unequally inciso-serrate bristle-pointed; st. much branched many-flowered hairy substrigose; ped. clothed like

the st. with generally spreading soft hairs; sep. hairy with more upright hairs; *caps. smooth shortly obovate or turbinate subglobular*, lobes of the stigma-disk imbricated laterally.—Desf. 1. 406; Brot. ii. 253; EB. t. 645; DC. 1. 118; Sm. E. Fl. iii. 11; Presl 32; WB.! i. 59; Koch 31; Bab. 15.—Herb. ann. Mad. reg. 1, 2; PS. reg. 2; ccc. Cornfields and waste ground. Apr.–June.—St. 6–18 in. high. Fl. large deep scarlet with usually a black patch at the base of each pet.—Var.:

α. hairs of ped. spreading.—Mad. and PS. ccc.

β. hairs of ped. adpressed.—*P. Rhœas β. strigosum* Bönningh. ex Koch l. c.—PS. $\frac{r}{2}$, Pico de Conselho, intermixed with *α*; Mad. r, along the Levada de S^{ta} Luzia, the pet. wanting the usual black spot.

2. P. DUBIUM L.

Hispid-pilose; l. 1–2-pinnatipartite, their segments linear remotely inciso-serrate bristle-pointed; st. many-flowered hairy, the hairs spreading, *those of the ped. adpressed*; sep. hispid; *caps. smooth narrow-oblong clavate*; stigma-disk with few *distinct and distant lobes or crenatures.*—Brot. ii. 253; EB. t. 644; DC. 1. 118; Sm. E. Fl. iii. 10; WB.! i. 59; Koch 32; Bab. 15.—Herb. ann. Mad. reg. 2, $\frac{c}{2}$. Cornfields above the Mount, Cayadas Ravine, &c. Apr.–July.—St. 1–2 feet high. Fl. large paler scarlet than in *P. Rhœas*, their claw black. Herbage also paler. Caps. elongate, marked lengthways with pale lines.

*** Filaments dilated upwards; caps. smooth.*

3. P. SOMNIFERUM L. **Common White or Garden Poppy.** *Papoula.*

Smooth *pale glaucous*; st. very erect little branched *many-flowered*; l. broadly oblong waved or curled, *irregularly and somewhat bluntly toothed*, the lower unequally sinuated cut and lobed attenuated towards the base, the upper undivided *cordate at the base* amplexicaul; *st. ped. and sep. smooth*; caps. smooth *short truly globular and very glaucous.*—Desf. 1. 407; Brot. ii. 254; EB. t. 2145; DC. 1. 119; Sm. E. Fl. iii. 11; Koch 32; Bab. 12.—Herb. ann. Mad. and PS. reg. 1, 2, c; ND. r; MD. 2, c; SD. 1, 2, ccc. Waste ground amongst vineyards and cornfields about Funchal, &c. Apr.–June.—St. 2–4 ft. high. Whole pl. very smooth except now and then a bristly hair or two upon the ped. and sep. or tipping the teeth of the l. Fl. large, uniformly in Mad. bluish-white with the claw violet.

4. P. SETIGERUM DC.

Dark or dull lurid smoky green scarcely glaucous; st. very erect little-branched *few-flowered*; l. oblong *regularly and*

sharply doubly aristato-serrate, the teeth sphacelate and callous, tipped with a stiff bristly awn or mucro, the midrib and principal nerves beneath hirtose or copiously fringed or bearded with long bristles, the lower l. more sinuate or lobed, attenuated at the base, the upper undivided *sessile subamplexicaul not cordate*; st. smooth; *ped. more or less hirtose with erect or adpressed bristles,* rarely quite smooth; *sep. copiously bristly upwards,* the bristles erect or adpressed; caps. smooth top-shaped *oval or ovate-oblong* scarcely glaucous.—DC. 1. 119; Deless. Ic. ii. t. 7. *P. somniferum a. Setigerum* WB.! i. 58, 59.—Herb. ann. PS. reg. 1; c. About the town and to the eastward in fields, waste ground and vineyards at the back of the beach, and in cornfields again 2 or 3 miles to the westward, growing often intermixed with *P. somniferum* L. Apr., May.—St. 2–3 feet high. Fl. large, like those of *P. somniferum* L., but the pet. uniformly dull purple with a broad darker atropurpureous spot at their base. Stigma-disk 9–10-rayed. Caps. more oblong than globular, and like the whole pl. scarcely (except in a dried state) glaucescent. This and the dark or lurid dull green of the foliage, the finely and regularly biserrate l. with aristate teeth, and colour of the fl. give a peculiar aspect to the pl., distinguishing it to the eye at once from the nearly allied *P. somniferum* L. The two pl. in PS. grow continually intermixed, preserving mutually their distinctive characters; but intermediate forms have not occurred, nor has *P. setigerum* been found in the Dezertas or Madeira.—A not uncommon var. of *P. somniferum* L. with bristly fl.-stalks, sometimes seen in English gardens, has perhaps been often taken for this pl.; which has also been supposed to be merely the wild state of *P. somniferum* L., an idea to which the facts above related are opposed.

2. Glaucium Tourn.

Horned Poppy.

1. G. corniculatum (L.) Curt. **Scarlet Horned Poppy.**

Hispid-pubescent; st. pilose; l. all sinuate-pinnatifid oblong, the upper sessile and truncate at the base; pods hispid-pilose.—DC. 1. 122 (var. *a.*); WB. i. 56, 57 (the Fuerte-venturan pl.); Koch 32. *G. phœniceum* EB. t. 1433; Sm. E. Fl. iii. 7; Bab. 16. *Chelidonium corniculatum* L. Desf. i. 404.—Herb. ann. PS. reg. 1; rr. Waste ground amongst cornfields and vineyards towards the S.W. end of the island, P^ta^ de Malhado. Apr., May.—St. 1–2 ft. high with remarkably rigid stiffly divaricated branches. Whole pl. pubescent or pilose rather than hispid, scarcely or not at all glaucous. L. furry with short crumpled cottony hairs. Fl. rather small. Pet. scarlet with a black patch at the base. Pod 6–8 in. long narrow, finely and rather closely erecto-

pubescent. In the Canaries, except in Fuerte-ventura, the fl. according to WB. are always y.

3. CHELIDONIUM L.

Celandine.

†1. C. MAJUS Mill. *a*, L.—*Ceredonha.* **Common Celandine.**

L. deeply pinnatifid; fl. umbellate, fil. dilated upwards.—Brot. ii. 255; Sm. E. Fl. iii. 4; WB. i. 55; Bab. 16; Koch 32. *a. obtusilobum*; segm. of l. rounded and bluntly lobed or crenate. —*C. majus a*, Sm., Koch, Bab. l. c.; *C. majus* EB. t. 1581; DC. 1. 123; Presl 1. 34.—Herb. per. Mad. reg. 1, 2; c. Rocks, walls and waste places about towns or houses everywhere. Spr. and Sum.—Habit of a Siliquose Cruciferous pl., remarkable for the thick bright or. juice of its roots and y. juice of the l. and st. St. 1–2 feet high and with the sep. more or less hairy, sometimes almost woolly. L. deep full gr. above, pale glaucous and pubescent beneath. Fl. bright y. Caps. slender smooth.

Order IV. FUMARIACEÆ.

The Fumitory Family.

Sep. 2 deciduous. Cor. irregular; pet. 4 cruciate, one or both of the 2 outer gibbous or saccate at the base, the 2 inner cohering at the tip. Stam. 6 in 2 sets opposite the 2 outer pet.; anther of middle stamen in each set 2-celled, of the side stamens 1-celled. Ov. free 1-celled; ovules 1 or more. Style filiform. Stigma with 1 or more points. Fr. an ach., caps., or silique. Seeds crested.—Herbs with alternate multifid l. and watery juices. Fl. mostly in racemes.

1. FUMARIA. Sep. 2. Pet. 4; the upper one spurred at the base. Stam. diadelphous. Fr. an ach. (indehiscent 1-seeded silicle).

1. FUMARIA L.

Molarinha. Fumitory.

** Ripe fruit even.*

1. F. MURALIS Sond. in Koch. *Molarinha.*

Ach. nearly or quite even, perfectly globose or equably orbicular all round, either quite entire and merely dimpled on each side, or with a minute inconspicuous notch or crenule at the apex, not apiculate mucronate or retuse; sep. rather broadly ovate acute generally jagged or toothed, rarely quite entire, *nearly as broad as but only* $\frac{1}{3}$ *the length of the cor.*; br. linear or narrow-oblong *half the length of the erecto-patent pedic. in fr.*; rac. rather short

broad lax and few-fl.; general and partial l.-stalks twining prehensile; segm. of l. flat broadish ovate-wedge-shaped mostly trifid, their laciniæ oblong obtuse mucronulate.—Koch 1017. *F. Petteri* Koch 435 (not Reichenb.).—Herb. ann. Mad. reg. 1, 2, 3, ccc. PS. reg. 2, c; 4, rrr. ND. 1, r. Nov.–July—St. 1–3 ft. long rampant climbing usually by the prehensile l.-stalks. Very variable in size, luxuriance and glaucescence of herbage; less so in size and colour of fl. which are mostly from 4–6 lin. long more or less deep rose with the tip dark atropurpureous or black, seldom pale. Ach. obtuse or equally rounded at top as elsewhere, and neither pointed (apiculate) or mucronate, nor truncate or retuse; but either wholly uninterrupted at the apex, with the minute short not prominent white scar-like base of the style remaining and having a slight dimple or depression on each side of it, or else with a minute indistinct or inconspicuous notch or crenule: the surface in the living pl. mostly quite even or at least comparatively so with that of the following sp.; yet sometimes and especially in the dried pl. very obsoletely verruculate or indistinctly rugulose with (as it were) close-shaven pimples when examined with a lens.—Var.:

α. vulgaris; more or less glaucous; fr. mostly even, quite entire at the apex; sep. toothed.—*F. muralis* Sond. Alex. Jordan! 1852 (fr. minutely verruculate) v. s. in HH. *F. officinalis* Buch! 195, no. 303; WB.! i. 53; Bourg.! Pl. Can. no. 1173 in BH. and HH.; Vogel.! in HH. and Solander in BH. (as to Mad. spec.); not Linn. *F. media* Bourg.! Pl. Can. (Teneriffa, San Diego del Monte in arvis, Jan. 1845) no. 293, in BH. and HH. (not Loisel.). *F. capreolata* var. *Bastardi* Bourg.! Pl. Can. (ex itinere 2do) Teneriffa, S. Diego del Monte in cultis, 10 Mart. 1855, no. 1232 in HH. (not Linn.). *F. Bastardi* (Boreau) Boissier et Reut.! It. Alg. Hispan. 1849 (fr. quite even) in HH.—Mad. ccc, everywhere in waste and cultiv. ground; the commonest of weeds in vineyards, gardens, cornfields, by roadsides, in beds of ravines, &c. about Funchal and elsewhere.—Varies according to soil or exposure: (1), larger more robust and often less glaucescent with broader larger lfts. and fl. twice as large 4–6 lin. long often paler; and (2), smaller more bushy and slender, with smaller more finely divided lfts. and smaller darker-coloured fl.: the former state occurring in rich or moist soil and shady spots, the latter later in the season or in sunny drier places, as amongst corn.

β. pustulosa; glaucous; fr. rather larger and especially in the dried pl. more distinctly verruculate, with a minute notch or crenule at the apex; sep. toothed.—*F. Bastardi* (Boreau) Krälik! Pl. Tunet. no. 7 in HH.; Balansa! Pl. d'Alger. no. 627 in HH. *F. capreolata* var. *β. patula* (Coss. ex Germar) Bourg.! Pl. de la Corse, no. 20 in BH. and HH. (not Linn.).

—Herb. ann. PS. reg. 2, c; ND. 1, r.—Sandy cornfields and waste ground towards the Fonte d'Aréa in PS., Apr., May; ND. near the ruined house, June, but nearly dried up with paler smaller fl. and very glaucous whitish foliage. The ach. in this ND. pl. appeared "perfectly smooth and even" (MSS. Notes) when fresh gathered. They are minutely but evidently verruculose and rugulose, or tuberculated with little flat pimples and slightly wrinkled in the dried state.—This is a very trivial var. and rather a mere accidental state of *a*. I found only a single spec. in the ND., and unfortunately preserved one only of the PS. pl. I cannot therefore vouch for the constancy of the foregoing characters, and should not have noticed here the form at all, but for its exact agreement on comparison with *F. Bastardi* Bor. of the botanists above quoted.

γ. læta; like *a.* (1), but of a light y.-gr., not in the least smoky or glaucescent; lfts. more regularly ternate ovate and leaflike; fl. not larger than in *a.* (1), but handsomer and more brightly or distinctly coloured; sep. quite entire or only sometimes here and there indistinctly toothed; fr. indistinctly and obsoletely verruculate.—PS. on the rocky summit of Pico de Facho, Apr. May.—Approaches *F. capreolata* (L.) Koch; but the sep. though mostly entire and rather large and broad are only $\frac{1}{3}$ instead of $\frac{1}{2}$ the length of the cor., the fr.-stalks are not "patent or recurved," the fl. are darker full rose-colour and smaller, and the ach. (entire at the apex as in *a.*) are exactly orbicular and hence only obtuse (as in *a.* and *β.*) not "subtruncate" or "very obtuse." Rac. 8–12- or 15-fl.; fl. tipped conspicuously with deep purple-black.—The true *F. capreolata* L. has never occurred in either PS. or Mad. It is constantly distinct from every state of *F. muralis* by its larger pale fl., large leafy sep. half the length of the cor., recurved fr.-stalks, and more obtuse ach.

** *Ripe fr. distinctly verruculate.*

2. F. PARVIFLORA Lam.

Ach. strongly verruculate globose or equably orbicular all round with a short minute mucro at the apex; sep. subovate *strongly toothed or jagged very minute and inconspicuous* not $\frac{1}{10}$ the length and not above $\frac{1}{2}$ or $\frac{1}{3}$ the breadth of the cor.; br. narrow-oblong usually as long as the short erecto-patent fr.-stalks; rac. nearly sessile short few-flowered; general and partial leafstalks simple not prehensile; segm. of l. ternate, their laciniæ narrow linear-oblong or ligulate acute cuspidate, st. suberect or erecto-patent, branches diffusely spreading.—*F. parviflora* Lam. Dict. 2. 567; Brot. 1. 592; DC. Syst. 2. 136 and Prod. 1. 130 (excl. syn. Sm. EB. t. 590); Presl 38; RIB. 41. t. 50. f. 102; RFG. iii. t. 1. f. 4451; WB.! 1. 53; Bourg.! Pl. Can. no. 437 in BH.

and HH.; Koch 36, 1018. *F. fol. tenuissimis, fl. albis circa Monspelium nascens*, Vaill. Bot. Par. 56. t. 10. f. 5. *F. parviflora* β. *albiflora* Moris. Fl. Sard. 1. 91. *F. parviflora* β. Walp. Rep. 1. 122 (excl. syn. *F. Vaillantii* Lois. and RFG. iii. t. 1. no. 4452). "*F. leucantha* Viv. Fl. Cors." ex. Moris. l. c.; De Heldreich! in HH. *F. Vaillantii* EBS. t. 2877; Bab. 17, 18 (not Loisel.).—Herb. ann. PS. reg. 1; cc. Vineyards and cultivated ground about the town and all along behind the beach towards P^ta^ de Malhado, Apr., May.—Very glaucous leafy and bushy, with rather short branches 6–18 in. long. Fl. white or greenish-white, very distinctly tipped with black and gr., very small, 1½–2 lines long. Rac. dense in fl., lax in fr. Sep. like minute scales and scarcely visible without a lens, somewhat irregular in shape, narrower even than the pedicels. Ach. the size and shape of those of *F. muralis*, but with a minute abrupt projecting point or mucro at the apex, and strongly and distinctly granulate. Herbage strongly smoky-glaucous pale or whitish.—This is certainly the true *F. parviflora* Lam. of almost all continental botanists, as Cosson! Bové! Schimper! Kotschky! Hohenacker! Krälik! Boissier! Bourgeau! Webb! &c. in HH. And though not a question directly affecting the Mad. Fl., I am almost equally satisfied, by examination of numerous authentic specimens from different countries and authors in HH., together with a careful scrutiny of synonyms and figures, that not only *F. parviflora* EB. t. 590 (with larger fl. than usual), Sm. E. Fl. iii. 256 (which however comprehends the true white-flowered *F. parviflora* Lam.) and Bab. 17, but also that the true *F. Vaillantii* Loisel. (Not. 102, Fl. Gall. ii. 101; Vaill. Bot. Par. 56. t. 10. f. 6; RIB. p. 42. t. 50. f. 103; RFG. iii. t. 1. f. 4452; WB. 1. 53) are merely purple-flowered varieties, forms or modifications of the same sp. Little or no dependence can be placed on the laciniæ of the l. being more or less narrow (*i. e.* filiform or linear) as in EBS. t. 2877. Compare *F. parviflora* α. and β. in Moris. Fl. Sard. 1. 91, with remark at the end.

Order V. CRUCIFERÆ.

The Cabbage, Mustard and Cress Family.

Sep. 4 deciduous, the 2 side ones gibbous at the base. Cor. regular cruciform; pet. 4 alternate with the sep. opposite each other. Stam. 6 (rarely 4) tetradynamous, the 2 shorter opposite the side pet., the 4 longer in pairs opposite the anterior and posterior sep. and stigmas. Torus with green glands between the pet. and stam. or stam. and ovary. Ov. free 1–2-celled with 1, 2 or more ovules in each; placentas parietal meeting in the middle and forming a false dissepiment. Stigmas 2. Fr. a silique (pod) or silicle (pouch) mostly 2-celled with a spurious

dissepiment and bursting by 2 valves, rarely 1-celled and indehiscent, 1–many-seeded.—Herb. rarely shrubby, sulphurously fetid in decay, antiscorbutic and stimulant, never poisonous. L. alternate. Fl. y. and white, more rarely purple or violet.

Suborder I. SILIQUOSÆ.

Pod long and narrow, with 2 valves opening longitudinally, and 2 cells separated by a long narrow linear spurious dissepiment.

Tribe I. *ARABIDEÆ.*

Seeds flattened or compressed, often bordered, their cotyledons accumbent parallel to the dissepiment of the pod; radicle lateral applied to their edges.

1. Matthiola. Pod linear round or compressed. Stigma 2-lobed, lobes erect or converging, gibbous or horned at the back.
2. Cheiranthus. Pod linear quadrangular or compresso-quadrangular 2-edged, with a prominent longitudinal nerve or keel along the back of each valve. Stigma 2-lobed, lobes spreading or recurved. Seeds in a single row in each cell.
3. Nasturtium. Pod rather short thick and swollen roundish-tapering or elliptic; valves convex almost nerveless. Stigma capitate. Seeds irregularly in 2 rows in each cell.

†4. Barbarea. Pod linear round or subquadrangular; valves convex with a subprominent longitudinal nerve. Stigma capitate obtuse entire or notched. Seeds in a single row in each cell.

5. Arabis. Pod linear compressed; valves flattish with a more or less prominent longitudinal nerve, or nerveless with several longitudinal veins. Stigma obtuse. Seeds in a single row in each cell.
6. Cardamine. Pod linear or lanceolate-linear compressed; valves flat nerveless. Stigma capitate. Seeds in a single row in each cell, their funicle simple filiform.

Tribe II. *SISYMBREÆ.*

Seeds ovate or oblong not bordered. Cotyledons incumbent contrary to the dissepiment, radicle dorsal applied to their back.

7 Sisymbrium. Pod linear round rarely quadrangular; valves convex with 3 longitudinal nerves. Stigma obtuse entire. Seeds in a single row in each cell, smooth; their

funicle filiform. (In *S. thalianum* the pod is quadrangular and the valves keeled with the side nerves fine and obsolete: thus approaching *Erysimum*.)

Tribe III. *BRASSICEÆ*.

Seeds often globose. Cotyledons incumbent conduplicate folded together longitudinally in the middle, radicle dorsal embraced in their fold.

8. BRASSICA. Pod linear or oblong; valves convex with a single straight dorsal nerve; lateral nerves none or represented by a few anastomosing veins. Seeds globose in a single row in each cell.

9. SINAPIS. Pod linear or oblong; valves convex with 3 or 5 straight prominent strong nerves. Seeds globose in a single row in each cell.

10. SINAPIDENDRON. Pod linear slender curved or wavy, round or slightly quadrangular subtorulose; valves convex with a single strong straight dorsal nerve and a few lateral longitudinal anastomosing veins. Seeds subangular oval or oblong in a single row in each cell and partly imbedded in the somewhat spongy dissepiment.

11. ERUCA. Pod oblong short; valves convex with a single subprominent dorsal nerve. Seeds globose in a double row in each cell.

SUBORDER II. SILICULOSÆ LATISEPTÆ.

Pouch short oval orbicular or globose, compressed from back to front, opening with 2 broad valves, 2-celled; partition or dissepiment nearly or quite as broad as the pouch in its broadest diameter.

Tribe IV. *ALYSSINEÆ*.

Seeds compressed. Cotyledons flat accumbent.

12. KONIGA. Pouch oval or roundish compressed, each cell 1–2-seeded. Filaments simple not winged or toothed. Hypogynous glands 8. Carpophore none.

13. DRABA. Pouch oblong or elliptic slightly convex or tumid. Seeds many in each cell, not margined, in 2 rows. Filaments simple.

SUBORDER III. SILICULOSÆ ANGUSTISEPTÆ.

Pouch short, compressed laterally, opening (except in *Senebiera*) with 2 narrow generally boat-shaped valves keeled or winged on their back; dissepiment narrow linear or lanceolate acute at each end.

Tribe V. *THLASPIDEÆ.*

Seeds compressed. Cotyledons flattened accumbent.

14. THLASPI. Pouch oval or obovate notched; valves boat-shaped winged at the back; ovules 4 or more in each cell, rarely 2. Pet. equal or nearly so. Filaments simple.

15. TEESDALIA. Pouch roundish or oval notched; valves boat-shaped keeled below, narrowly winged upwards at the back; ovules 2 in each cell. Pet. equal or the 2 outer larger. Longer filaments with a scale or petal-like appendage at the base.

Tribe VI. *LEPIDINEÆ.*

Seeds compressed. Cotyledons flattened incumbent.

16. LEPIDIUM. Pouch orbicular or oblong, roundish or ovate notched or (rarely) entire; valves compressed boat-shaped keeled or winged at the back; cells 1-seeded. Pet. equal. Filaments simple.

17. CAPSELLA. Pouch triangular-obcordate; valves compressed boat-shaped keeled but not winged; cells many-seeded. Filaments simple.

Tribe VII. *SENEBIEREÆ.*

Seeds turgid subglobose or ovate. Cotyledons long linear doubly incumbent twice bent or folded.

18. SENEBIERA. Pouch subreniform or 2-lobed not bursting or at least not scattering the seeds; cells 1-seeded.

SUBORDER IV. SILICULOSÆ NUCUMENTACEÆ.

Pouch short not bursting often 1-celled from abortion of the dissepiment.

Tribe VIII. *ISATIDEÆ.*

Seeds ovate-oblong. Cotyledons incumbent slightly channeled.

19. ISATIS. Pouch oblong-cuneate or oval longer than broad compressed laterally 1-celled 1-seeded; valves boat-shaped keeled or winged scarcely bursting.

SUBORDER V. LOMENTACEÆ.

Pod indehiscent divided transversely into 1-seeded cells or joints; the lowest cell or true pod often barren, the seeds being in the beak.

Tribe IX. *CAKILINEÆ.*

Seeds "elliptical" Sm. Cotyledons accumbent.

20. CAKILE. Pod short oblong quadrangular of two 1-seeded indehiscent joints, the upper deciduous ovate-ensiform with an erect seed, the lower persistent corky subturbinate barren or with a pendent seed.

Tribe X. *RAPHANEÆ.*

Seeds globose. Cotyledons incumbent conduplicate.

21. RAPISTRUM. Pouch 2-jointed, joints each 1-seeded indehiscent, the upper globose or ovate and produced into the style with an erect seed, the lower round resembling a thickened pedicel with a pendent seed, rarely barren. Funicles short.

22. CRAMBE. Pouch 2-jointed, joints indehiscent, the upper deciduous globose or ovate with one seed pendent from a long curved funicle springing from the bottom of its cell, the lower joint barren resembling a pedicel. Longer filaments generally forked.

23. RAPHANUS. Pod of several 1-seeded cells, linear or subcylindric-oblong and subconic tapering upwards, either even and not separating, or moniliform and dividing transversely into 1-seeded indehiscent joints, the lowest joint barren imperfectly 2-valved, resembling a pedicel.

SUBORDER I. SILIQUOSÆ.

Tribe I. *Arabideæ.*

1. MATTHIOLA R. Br.

Stock.

* *Pachynotum* DC. Pet. obovate. Stigmas gibbous not horned at the back.

1. M. MADERENSIS Lowe. *Goivos. Cravo de rocha. Bofe de Burro.*

St. herbaceous suffrutescent at the base erect, branches spreading; l. elongato-lanceolate acute softly tomentose hoary or greyish-white almost always very entire, the lowest forming a dense rose-like tuft; pedic. shorter than the cal.; pods spreading very long and slender compressed generally muricato-glandulose. —Novit. 551 or 29.—Herb. bien. Mad., PS., N. and MD. reg. 1, 2, cc; SD. rrr.—Sea-cliffs everywhere, Febr.-Aug.—A representative and close ally of the European *M. sinuata* and *incana*

L., but in Mad. constantly distinct. A large branching pl. 1–3 ft. high; flowering branches elongated; some of the l. occasionally here and there faintly repand-toothed; fl. rather pale violet or dingy violet-purple, very rarely pure white, fragrant (with a slight pungency) at night only; pods distinctly compressed not torulose 3–5 in. long, $1\frac{1}{2}$–2 lines broad, generally waved and thickly muricate with large stipitate glands. The following may be distinguished, but are scarcely entitled to rank as var.

α. muricata; fl. lilac, pods and fl. branches thickly muricate with glands.—Sea-cliffs everywhere.

β. mitis; fl. lilac, pods and fl. branches nearly or quite without glands. Occasionally with *α.* in Mad., PS., and MD.; very rare.

γ. albiflora; fl. pure white. Occasionally with *α.* in Mad.; very rare.

2. CHEIRANTHUS L.

Wall-flower.

* *Cheiroides* DC. Style slender elongate. Seeds marginate. Pods quadrangular.

1. C. TENUIFOLIUS Her.

Shrubby, *branches slender and fragile* often tortuous; *l. linear* acute *very narrow and entire* grey or hoary densely silky *somewhat stiff and strigose*; *fl. y.*, pods linear very slender stiffly erect or erecto-patent.—DC. Syst. ii. 183; Prod. i. 136.—Shr. per. Mad. reg. I, rrr.—Cabo Giraõ, and Pico de Facho or P. de Rancho between the former and Camera de Lobos, along the edge of the cliff at a height of from 1500 to nearly 2000 ft., Mar.–June.—A small shr. 1–2 ft. high, with longish slender often tortuous or twisted and entangled very brittle pale greyish naked branches, bearing a tuft of fine narrow almost filiform grey l. about an inch long and only half a line broad, at their ends. Fl. lemony. rather large, like those of a *Sinapis*, not versicolorous or fragrant, at least by day. Style 2 lines long capitate. Pods stiff straight very slender and narrow, 1–2 in. long. Seeds numerous.—The pl. referred to by myself (Prim. p. 57) as *Ch. tenuifolius* Herit. and by Webb and Berth. 1. 67 as *Dichroanthus tenuifolius*, was the following sp., *Ch. arbuscula*, which I gathered abundantly halfway up Pico Branco in Porto Santo with my lamented friend Webb in May 1828. The true *Ch. tenuifolius* Herit. has never yet been found in Porto Santo.

2. C. ARBUSCULA Lowe.

Shrubby *dwarfish thickly bushy and leafy*; st. erect short, *branches stout short stunted* forming usually a dense capitate head; *l. linear* a little broader upwards acute *very entire* grey or

hoary *harshly strigose spreading or recurved*; *fl. lilac*, pods large *stiffly and closely erect.*—Hook. Journ. Bot. 8. 289.—Shr. per. PS. reg. 3, 4, r.—Rocks towards the summits of Pico Branco and P. de Conselho abundant, March–May.—A low tufted bushy shrub 4–8 or 9 in. high, with a stout very short stiff flexuose woody stem as thick often as the little-finger, dividing at a height of 2 or 3 inches into several short branches, each terminating in a thick rose-like tuft of spreading or recurved perfectly entire narrow linear leaves from $\frac{1}{2}$ to 1 in. long and about a line wide, densely clothed with adpressed bristles, scabrous and harsh to the feel. Fl. large and handsome in perfectly erect short numerous close terminal racemes 2–4 in. high, as large as in *C. mutabilis* Her. and of the same more or less deep lilac, but not in the wild pl. (so far as observed) either changeable or fragrant; their pedic. not shorter than the sep. Style 2 lines long; stigma capitate bilobed. Pods large 1–2 in. long and 1 line broad subquadrangular apparently smooth but really covered with short close-pressed bristles; each valve with a prominent dorsal rib. —Cultivated in England by the Rev. M. J. Berkeley, it preserves in great measure its peculiar habit, the branches only becoming more lax and slender and the foliage less hoary. In gardens near the sea especially it thrives vigorously in the open air, and is very ornamental on rock-work, flowering abundantly in the summer, but perishing with the first autumnal frosts. In pl. kept in a greenhouse the fl. were larger and always lilac. In others treated more hardily they were smaller, and at first white. M. J. B. in HH.

3. C. MUTABILIS Her. *Goivos. Quebra Panella.*

Shrubby loosely branched, *branches simple straight and elongate, l. linear-lanceolate sharply serrate scarcely hoary and not closely silky-pubescent*; *fl. lilac* fading into white, *pods erecto-patent.*—Curt. BM. t. 195; DC. Syst. ii. 183 (var. *a.*); Prod. i. 136. *Dichroanthus mutabilis* WB.! i. 66. t. 8 A. f. 1–3 (pod).—Shr. per. Mad. reg. 3, $\frac{c}{v}$.—Rocks in ravines everywhere above 2500 ft.; Rib. Frio abundant, March–June.—Like *C. tenuifolius* in habit, but taller (2–4 ft.) and altogether larger and more robust, with long straight straggling branches generally pendent from the sides or face of perpendicular high rocks. L. dull green somewhat naked scarcely at all hoary or silky, 1–3 in. long and $\frac{1}{4}$ in. wide but extremely variable in both respects, sometimes at high elevations and on bare exposed mountain peaks very narrow as in *C. tenuifolius*, but always serrate; the teeth very fine and sharp almost pungent. Fl. in large and handsome terminal bunches, cream-colour in the bud, then more or less deep lilac, lastly white, fragrant like the white Jessamine at night. Pods about 2 in. long and 1 line wide stiff and straight.—Dwarf

starved or stunted pl. with the l. very narrow differ greatly in appearance from luxuriant pl. growing on more shaded rocks with larger broader greener and more naked l. But every intermediate form occurs between the two extremes: nor are the fl. less variable in intensity of colour in different situations, ranging from full bright lilac to almost white.

3. Nasturtium R. Br.

* *Cardaminum* DC. Pet. white entire, longer than the sep.

1. N. officinale R. Br. **Water Cress.** *Agriaõ.*

Pods spreading ascending scarcely longer than their often subdeclining stalks, wavy or subtorulose; l. lyrato-pinnate, leaflets subsinuate or repand, the lateral elliptic, the terminal one larger more rounded and subcordate.—DC. Syst. ii. 188; Prod. 1. 137; EB. 855; Sm. E. Fl. iii. 192; Presl 44; WB. i. 71; Koch 37; Bab. 22. *Sisymbrium Nasturtium* Desf. ii. 81; Brot. 1. 587.—Herb. per. Mad. reg. 1, 2, 3, ccc; PS. reg. 2, rrr. Watery places and streams in Mad. everywhere; in PS. only at the Fonte d'Aréa; not found in any of the Dezertas. Febr.–July, but almost throughout the year.—Whole pl. generally smooth, occasionally here and there a little hairy. St. creeping or procumbent rooting copiously, often floating. Cal. always closed with the sep. erect. Fl. white rather small. Very variable in size and luxuriance; when growing out of water, with small leaflets and short st., it is according to Koch and Babington *N. microphyllum* Reich.; when very large with stout thick st. and large leaflets like a *Sium*, it is *N. siifolium* Reich. (*N. officinale* β. Koch).

4. Barbarea R. Br.

†1. B. præcox R. Br. **Early Winter Cress.**

Lower l. lyrate, the pairs of lobes gradually larger upwards, the upper pair nearly as large as the roundish subcordate ovate or oval terminal lobe; upper l. deeply pinnatifid with parallel distant very entire linear or linear-oblong blunt lobes; pods long erecto-patent.—DC. Syst. ii. 207; Prod. 1. 140; Sm. E. Fl. iii. 199; WB.! i. 71, 2; Koch 40; Bab. 22. *Erysimum præcox* EB. t. 1129.—Herb. bien. Mad. reg. 2, r. Wet places by the upper road to the Jardim above the Estreito Church; and at a little hamlet called Ribeira de Machico at the head of the Machico Valley half a mile below the Portella. Apr.–July.—St. ribbed angular erect 1–2 ft. high. L. dark green, their terminal lobe not abruptly or greatly larger than the preceding. Fl. y. rather small and pale. Pods 2–3 in. long quadrangular. Whole pl. smooth. Flavour pungent not at all bitter: hence much used for early salads in Europe, though not in Mad.

5. Arabis L.

* *Alomatium* DC.; seeds without or with only an obscure slight narrow margin. Limb of pet. distinct from the claw, obovate spreading horizontally.

1. A. albida Stev.

L. somewhat sparingly but equably and strongly sinuate-toothed white or hoary tomentose (like the whole pl. except the pods) with branched starry pubescence, the lower l. crowded lanceolate-oblong or subspathulate, the upper lanceolate amplexicaul and slightly sagittate or cordate at the base; pedic. twice or thrice, pet. twice as long as the cal.; pods quite smooth very long and slender almost filiform loosely erecto-patent, ultimately vaguely spreading, curved or waved, valves faintly many-nerved; seeds oval or elliptic very narrowly and obscurely margined.—DC. Syst. ii. 217; Prod. 1. 142; Presl 47; WB.! i. 62, 63. *A. alpina* Buch! 196. no. 316 (not Linn.). *Turritis verna* Desf. ii. 92 (excl. syn.).—Herb. per. Mad. reg. 2, 3, c. Rocks in ravines, &c. everywhere above 1000 ft. flowering irregularly throughout the year but chiefly in Spr.—Rib. de S^{ta} Luzia, de Joaõ Gomez, Curral das Freiras, Rib. Frio, &c.—Habit of *A. alpina* L. but with larger more conspicuous fl. in larger fuller bunches. St. short procumbent sparingly branched thickly leafy subcæspitose; fl. st. ascending about 6 in. high. L. about 2 in. long and half an inch wide, the teeth equal prominent distinct and acute; st. l. varying with rounded angular or pointed basal lobes. Fl. conspicuous rather large and handsome pure white inodorous; limb of pet. horizontal as long as the claw. Pods 2–2$\frac{1}{2}$ in. long, $\frac{1}{2}$ or $\frac{3}{4}$ of a line broad compressed subtorulose tipped with a very short beak much narrower than the pod; the valves with several fine and slender nerves but no one prominent. Seeds compressed lenticular broadly oval or elliptic, *i. e.* as broad at one end as at the other, not ovate as in *A. alpina* L. Webb *l. c.* remarks that the gland at the base of the longer fil. is mostly wanting, whereas in *A. alpina* L. it is conspicuous and somewhat elongate.

6. Cardamine L.

1. C. hirsuta L.

St. slender straight angular; l. all pinnate not auricled at the base, leaflets of the lower l. shortly stalked roundish repand-sinuate or toothed, the terminal one rather larger, of the upper l. narrower oblong or linear; pet. twice as long as the cal. oblong-obovate, pods and pedic. erect, beak or style shorter than the pod is wide.—Desf. ii. 80; Brot. 1. 583; EB. t. 492; DC. Syst. ii. 259; Prod. 1. 152; Sm. E. Fl. iii. 188; Presl 52; Koch 47; Bab. 24.—Herb. ann. Mad. reg. 3, $\frac{c}{2}$. Moist shady places in ravines; Rib. Frio, de S^{ta} Luzia at the foot of the Waterfall, &c. Nov.–

June.—Nearly smooth or but slightly pubescent. Root-l. numerous in a rose-like tuft. St. 4–12 in. high slender straight angular erect sparingly branched and leaved. Fl. small white. Sep. erect. Stam. in the same pl. varying in number, generally 5, rarely 6, more rarely 4; 1 or 2 of the shorter wanting. Stigma capitate pubescent subsessile, the style being very short. Pods linear slender scarcely an inch long, half a line wide, the upper considerably overtopping the fl.

Tribe II. *Sisymbreæ.*

7. Sisymbrium L.

* *Velarum* DC. Pods subulate attenuated upwards. Fl. yellow.

1. S. officinale (L.) Scop.

More or less pubescent; l. pinnatipartite slightly runcinate, with 2 or 3 pairs of oblong coarsely and unequally toothed lobes and a large hastate terminal lobe; pods linear-subulate *short* and with their very short pedicels *close-pressed to the stem.*—DC. Syst. ii. 459, 460; Prod. i. 191; Sm. E. Fl. iii. 196; Presl 73; Koch 51; Bab. 25. *Erysimum officinale* L. Desf. ii. 85; Brot. i. 575; EB. t. 735. *Chamæplium officinale* WB. i. 76.

β. *leiocarpum* DC. l. c.; smoothish, pods with their pedicels and rachis quite smooth.—Herb. ann. Mad. reg. 1, 2, c; PS. reg. 1, 2, r. By roadsides and in waste ground and vineyards about Funchal, &c., chiefly below 1000 ft. March–June.—St. nearly smooth 1–2 ft. high straight erect, branches very tough and hard stiffly spreading subdivaricate, in fr. declining or deflexed. Foliage neither hoary nor dull green somewhat hispid downwards, the upper l. nearly smooth. Fl. inconspicuous small y. Pods $\frac{1}{2}$ an inch long hexangular.—These characters are constant. The more hairy common European state or var. is not found in Mad. In Teneriffe Webb states that both the smooth and pubescent podded varieties occur promiscuously.

2. S. erysimoides Desf.

Smooth, l. sinuate-pinnatipartite or lyrate-runcinate with 1 or 2 pair of coarsely and unequally toothed lobes and a very large triangular or rhomboidal terminal one; pods linear-subulate very slender and *rather long* subsessile *spreading almost horizontally.*—Desf. ii. 84. t. 158; DC. Syst. ii. 482; Prod. i. 195. *Pachypodium erysimoides* WB. i. 75.—Herb. ann. Mad. reg. 1, 2, c; PS. reg. 2, r. On walls and buildings and in waste places by roadsides in or near deserted houses about towns or villages, Funchal, Machico, &c. March–June.—Pl. 1–2 ft. high nearly

or quite smooth rather dark full green leafy. St. stiffly erect not much branched often violet or purple towards the base. L. stalked 4 or 5 in. long. Fl. y. very small and inconspicuous, the pet. scarcely longer than the sep. Pods shortly stalked an inch or more long attenuated upwards neither compressed nor angular but round and striated, the valves being distinctly 3-nerved. Seeds minute cylindric-oblong finely reticulato-punctate.—In habit as in characters allied to *S. officinale*. The identity of Desfontaines' pl. cannot be questioned, although he describes (probably from dried specimens) the fl. as being white: whence also doubtless its wrong reference by De Candolle to the following section. *Sisymbrium nitidum* Zea and *S. rigidulum* Lag. are also, according to Webb, precisely the same pl.

** *Arabidopsis* DC. Pods linear, fl. white.

3. S. THALIANUM (L.) Gaud.

L. undivided oblong-lanceolate subobtuse sparingly and slightly toothed subhispid with forked or simple hairs nearly all radical and stalked; st. slender more or less branched; sep. erect, pods 4-angular linear very slender ascending longer than their spreading pedicels.—Koch 53 (var. *a*); Bab. 25. *Arabis Thaliana* L. Brot. i. 579; EB. t. 901; DC. Syst. ii. 226; Prod. i. 144 (var. *a*); Sm. E. Fl. iii. 209; Presl 48.—Herb. ann. Mad. reg. 2, 3; rr. Dry rocks and banks in ravines; Rib. de Santa Luzia, da Metade, das Cayadas, &c. March–August.—A small inconspicuous delicate pale green pl. 3–10 in. high, of short continuance and easily overlooked. St. erect single or several from a small flat rose-like tuft of a few l., loosely branched, often simple, almost filiform, slightly hairy below, smooth upwards. Root-leaves scarcely $\frac{1}{2}$ in. long attenuated downwards into a stalk pilose, their hairs forked and simple; st.-l. few linear-lanceolate smoother than the others. Rac. elongated lax filiform. Fl. small white. Pedic. longer than the cal. Pet. obtuse about twice as long as the erect sep. Stam. about as long as the pet. Pods scarcely an inch long and $\frac{1}{4}$ of a line wide, not much longer than their pedic. very fine and slender subquadrangular, the valves having a prominent dorsal nerve, but the lateral nerves faint and obscure. Seeds bright tawny y. oval not striated.

Tribe III. *Brassiceæ*.

8. BRASSICA L.

††† 1. B. OLERACEA L. **Cabbage.** *Couve.*

L. smooth glaucous, the lower lyrate stalked, upper oblong sessile, rac. before flowering elongated lax, sep. and all the stam.

erect.—Desf. ii. 93; Brot. i. 580; DC. i. 213; Koch 58. *B. oleracea* and *B. Botrytis* Presl 88, 89.—Var.:

B. *acephala* DC.; st. elongated branched, l. expanded.—*Sprouts* or *Winter Greens.* Subvarieties, *Couve de Rinchaõ, C. de Batatinha,* &c.

D. *capitata* DC.; st. short, l. concave imbricate forming a dense globose head.—*Common Cabbage.* Subvar. *Couve Murciana, C. de Repolho, C. roxa,* &c.

F. *Botrytis* DC. (*Brassica Botrytis* Presl 89); fl. abortive and with their thickened fleshy stalks forming a compact dense corymb.—Subvar. *Cauliflower, Brocoli,* &c. *Couve Flor.*

Herb. bien. Mad., PS., MD., reg. 1, 2, 3; B, D, ccc; F, $\frac{r}{2}$.—F, cult. in gardens only; B, D, in gardens and fields, cult. and partially naturalized, everywhere, throughout the year; forming a staple article of food amongst all classes, and a principal ingredient in Portuguese *Sopas.*—Although the exact original wild stock (*B. oleracea* A, DC.; EB. t. 637; Sm. E. Fl. iii. 219; Bab. 26) does not perhaps occur, the varieties B and D are too commonly found seminaturalized in some form or other to allow of their omission in a Flora of Madeira.—L. and whole pl. perfectly smooth more or less glaucous. Fl. rather large bright lemon-y., pale ochre, or more rarely white, not veined. Pods not beaked.

2. B. NIGRA (L.) Koch. **Black Mustard.** *Mostarda.*

L. all stalked, the lower hispid lyrate toothed with the terminal lobe very large and lobed, the upper smooth lanceolate very entire pendulous; sep. spreading; pods close-pressed to the st. quadrangular 2-edged shortly beaked.—Koch 59; Bab. ed. 1. 24. *Sinapis nigra* L. Brot. i. 585; EB. t. 969; DC. i. 218; Sm. E. Fl. iii. 222; Presl 95; Bab. ed. 4. 27. *S. incana* Herb. Linn. C. Lemann in litt. *S. incana* (Mass.) Buch 196. no. 320 (not of others).—Herb. ann. Mad. reg. 1, 2; ccc. Borders of cornfields and vineyards in waste ground about Funchal, &c., everywhere. Febr.–June.—St. 2–3 ft. high stiffly erect straight glaucous and purplish nearly smooth; branches remote straight slender with pendulous narrow l. and terminal rac. giving a peculiar light graceful habit to the pl. when flowering. Lower l. hispid or roughish, upper nearly quite smooth. Fl. bright lemon-y. Pet. roundish-obovate, entire. Pods half an inch long smooth torulose 1–4-seeded with a very short square slender seedless beak. —This is undoubtedly the pl. intended by Von Buch and others in their lists of Mad. pl. under the name of *S. incana* L. And in fact the late Dr. Charles Lemann found the original *S. incana* of the Linnæan Herbarium to be nothing but *S. nigra* L. The synonym has been however usually referred to a different pl., a specimen of which also exists in the Linn. Herb., though with-

out name or number, viz. *Erucastrum incanum* Koch, EBS. t. 2843 (*Hirschfeldia adpressa* Moench, WB. i. 85), which is found in Teneriffe but has not yet occurred in Madeira.

An old S. of Europe specimen (Herb. D^ni Yalden 1778) of *Diplotaxis muralis* β. DC. in the BH. has been formerly marked *Brassica muralis*; and, though totally unlike any pl. with which I am acquainted in Madeira, is the only semblance of authority I can discover for *Brassica muralis* of Buch's List of Mad. pl. p. 196. no. 317. His no. 311, *Cheiranthus littoreus*, ought also to have been quoted above under *Matthiola maderensis*; and nos. 312 and 313 (*Cheiranthus argutus* and *dentatus*) both under *Cheiranthus mutabilis*, of which *Ch. dentatus* is merely the more hoary narrower-leaved form from more exposed or sunny rocks, such as are indicated by the locality, "Ribeira dos Soccoridos," of the original specimens in BH.

9. Sinapis L.

1. S. arvensis L. **Wild Mustard or Charlock.** *Mostarda*, Madeira; *Saramago*, Porto Santo.

L. ovate-oblong unequally toothed, the lower sublyrate or auriculate at the base, the upper sessile; sep. spreading; pods subcylindric torulose not shorter generally longer than the conical 2-edged seedless beak, valves subprominently 3-nerved. —Koch 60; Bab. 27.—Herb. ann. Mad. reg. 1, 2, ccc; PS. reg. 1, 2, c; GD. reg. 2, c. Cornfields and vineyards in waste ground everywhere. Nov.–June.—St. 1–2 ft. high diffusely branched bristly towards the base with short deflexed hairs. Whole pl. scabrous. Fl. y. rather large. Pods suberect about an inch long including the long distinct beak, when ripe many-ribbed or angular. Seeds brown.—Var.:

α. Pods smooth. *S. arvensis* (L.) Brot. i. 584: EB. t. 1748; DC. Syst. ii. 615; Prod. i. 219; Sm. E. Fl. iii. 221; Presl 96; WB. i. 78. *S. incana* Lowe in Hook. Bot. Misc. New Ser. i. 42 (not of others).

β. Pods retrorsally hispid. *S. arvensis* β. Koch l. c. *S. orientalis* Brot. i. 584.—A Madeiran specimen of this var. in BH., with the lower part of the pod and often of the beak retrorsally hispid, has been ticketed "*Sinapis alba* Linn." by Solander.

†††2. S. alba L. **White Mustard.**

L. lyrato-pinnate, pinnæ unequally and coarsely toothed and lobed, the uppermost confluent; sep. spreading; pods hispid cylindric torulose not longer generally shorter than the sword-

shaped compressed 2-edged seedless beak, the valves subprominently 5-nerved.—Brot. i. 585; EB. t. 1677; DC. i. 220; Sm. E. Fl. iii. 222; WB. i. 77; Koch 60; Bab. 27.—*Bonannia officinalis* Presl 99.—Herb. ann. Mad. reg. 1, 2; rr. Occasionally in the neighbourhood of Funchal, but merely as an outcast or straggler from gardens. Apr., May.—St. 1–2 ft. high, and with the l. more or less hispid but always more so than the l. Fl. y. rather large. Pods spreading. Seeds pale.—This is the "Mustard" so commonly grown with "Cress" (*Lepidium sativum* L.) in Europe for winter or early spring salads. It has very slender claims however to a place in the Madeiran Flora.

10. Sinapidendron Lowe.

1. S. frutescens (Ait.) Lowe.

Shrubby mostly smooth much branched, branches interlacing fragile, l. crowded towards their ends stiff more or less fleshy, the lower oblong-lanceolate or elliptic-ovate regularly and distinctly serrate or crenate, the uppermost linear-lanceolate or linear quite entire; sep. at first erect presently subpatent immaculate.—Var.:

α. diffusa; branches long slender tufted often pendulous, l. less fleshy more distinctly veined serrate and more or less sprinkled with short adpressed strigose hairs.—*S. frutescens* Prim. 37. *Sinapis frutescens* Sol.! MSS. and BH.; Ait.! Hort. Kew. iv. 127; DC. Syst. ii. 623; Prod. i. 220; Hook. Bot. Misc. i. 119. t. 28. *Hesperis diffusa* Buch! 196. no. 315; Spr. Syst. ii. 900.—Shr. per. Mad. reg. 3, 4; ½. Rocks in ravines and highest peaks; Rib. de Santa Luzia on high rocks by the Waterfall, Caminho Central along the ridge dividing the Curral das Freiras from the Serra d'Agoa and under Pico Grande; Pico dos Arrieiros, &c. April–July.

β. succulenta; branches short stiff and thickish forming a low dwarf stunted shrub, l. in terminal rose-like tufts very thick and fleshy veinless obsoletely crenate perfectly smooth.—Shr. per. Mad. reg. 2; r. Sea-cliffs on the N. coast in several places between Santa Anna and S. Vicente; Vista da Rocha do Navio, Santa Anna; S. face of the Penha d'Aguia between Fayal and Porto da Cruz. May–July.

Branches often in *α* 3 or 4 ft. long interlaced and hanging in thick tangled tressy masses down perpendicular rocks: in *β* more erect. L. bright but rather pale gr. not glaucous. Fl. like those of *Brassica nigra* L. rather large bright lemon-y.; claw of pet. and fil., especially in *β*, purplish lilac. Sep. with a few short scattered hairs and even in *β* pale immaculate. Pods 1–2 in. long with a short cylindric seedless beak erecto-patent flexuose;

in β distinctly quadrangular and striated when ripe though previously round; in all stages smooth.

2. S. ANGUSTIFOLIUM (DC.) Lowe.

Shrubby *quite smooth*, branches interlacing elongated fragile; l. crowded towards their ends *all linear* veinless stiff and fleshy generally *quite entire* sometimes sparingly toothed upwards; sep. erecto-patent *spotted* with purple.—*S. salicifolium* Prim. 37, Novit. 29 or 551. *Sinapis angustifolia* DC. Syst. ii. 624; Prod. i. 220. *Brassica frutescens* Sol.! MSS. and BH.; Buch! 196. no. 318.—Shr. per. Mad. reg. 1; rrr. Beyond Camera de Lobos all along the sea-face of the Pico de Rancho or P. de Facho and Cabo Giraõ at a height of 1500–2000 ft. April–June. —Habit with fl. and fr. entirely of *S. frutescens* Ait.: but the shape of the l. is constant, without intermediate forms, and they are only toothed occasionally towards their tips. L. 2–3 in. long, 2–3 lines wide, generally perfectly entire but now and then with a few remote teeth towards their tips. Sep. sprinkled with a few short hairs pale mottled or speckled with purple. Limb of pet. short and broad bright lemon-y.; claw and fil. often purple. Pods as in *S. frutescens* β.

3. S. RUPESTRE Lowe.

Herb. suffrutescent at the base strigose-hispid; st. branched erect; l. stiffly scabrous harsh and rough ovate-oblong and lanceolate sharply toothed and sinuate stalked, the lowest sublyrate or auriculate at the base, the uppermost elongated linear-oblong or linear very entire; sep. widely or horizontally spreading quickly falling; pods smooth.—Prim. 37.—Var.:

α. *chætocalyx* Prim. 38; rough and bristly, l. stiff but not fleshy or succulent; pedic. germens and sep. hispid, the latter spotted with dark purple.—Herb. ann. or bien. Mad. reg. 3; rr. Ravines of the interior, Rib. da Metade, R. de S. Jorge. May–August.

β. *gymnocalyx* Prim. 38; smoother, l. more succulent thick or fleshy and shining, the lower shorter more oval or rounded and obtuse; pedic. germen and sep. smooth, the latter subimmaculate; pods short.—Herb. ann. or bien. Mad. reg. 1; rr. Sea-cliffs on the north coast at the Entroza and descending into Ponta Delgada. June–Oct.—A mere maritime state of α.

A tall upright large rankly growing sparingly and stragglingly branched pl. 3–4 ft. high, in general aspect or habit much resembling *S. arvensis* L. St. and branches woody downwards stout and stiff, divided in a straggling flexuose manner, angular or ribbed. Foliage dark gr. coarse and harsh; the l. large and rank. Fl. lemon-y. rather larger than in *S. frutescens*; claw of pet. and fil. almost always purple, Sep. conspicuously spotted

with dark violet-purple. Pods loosely erecto-patent slender about 2 in. long (in β. thicker and shorter) with a short seedless 2-edged beak $\frac{1}{8}$ in. long, subquadrangular subtorulose and striated. Seeds oblong subangular light brown finely reticulato-punctate, imbedded in the pithy or spongy dissepiment.

11. Eruca DC.

1. E. sativa Lam. *Fedorênte.*

St. and branches hirsute; l. lyrate pinnatipartite, their lobes toothed and all acute; pedic. shorter than the deciduous sepals. —DC. i. 223; Presl 104; WB. i. 79; Koch 62. *Brassica Eruca* (L.) Desf. ii. 95; Brot. i. 581; Spr. Syst. ii. 912.'

γ. DC., Presl l. c.; fl. pale ochre veined with black or dusky; pods smooth.—Herb. ann. PS. reg. 1, 2; ccc. Sandy beach, barren sunny slopes, borders of fields and roadsides, everywhere near the sea in Porto Santo and the Ilheo de Baxo.—A low spreading bushy pl. about a foot high with remarkably hard and tough stiffly divaricated straggling branches and dull greyish dark gr. more or less smooth foliage: when bruised or brushed emitting a strong rank foxy smell. Fl. like those of *Raphanus Raphanistrum* L., rather large ochroleucous with blackish purple or violaceous veins. Sep. erect rather long. Pedic. very short. Pods with their beak from $\frac{1}{2}$ to $\frac{3}{4}$ in. long, short and broad turgid, with a broad short 2-edged compressed ensiform pointed seedless beak $\frac{1}{4}$ in. long; valves with the dorsal nerve prominent. Seeds subovate subangular tumid numerous, regularly in 2 rows in each cell.

Suborder II. SILICULOSÆ LATISEPTÆ.

Tribe IV. *Alyssineæ.*

12. Koniga R. Br.

†††1. K. maritima R. Br. **Sweet Alyssum.**

St. suffrutescent downwards, procumbent; l. linear-lanceolate acute silky grey or hoary; pouches oval with an abrupt point smooth. — Bab. 28. *Lobularia maritima* (Desv.) Koch 65. *Clypeola maritima* L. Desf. ii. 72. *Alyssum maritimum* Brot. i. 558; EB. t. 1729; DC. Syst. ii. 318, 319; Prod. i. 164; Sm. E. Fl. iii. 162. *Alyssum halimifolium* Curt. BM. t. 101.

β. *canariense* DC. ll. cc.; branches elongated, cells of pouches often 2-seeded.—*Lobularia intermedia* WB. i. 92.—Herb. ann. Mad. reg. 1; r. Waste ground amongst vineyards about Funchal here and there: but a mere outcast of gardens. About

the Quinta do Val. Aug.–Dec.—St. numerous weak slender much branched from the base forming a low spreading tuft, presently in fr. elongated to the length of 1 or 2 ft. or more, the ends ascending. L. crowded small ½–1 in. long quite entire dull greyish-gr. clothed like the branches with copious close-pressed whitish silky forked hairs. Fl. very numerous pure brilliant white in terminal corymbose racemes which are much elongated in fr. Pouch oval or elliptic erecto-patent. Seeds 1 or 2 in each cell.—Seems scarcely worth distinguishing as a var. from the usual European garden pl. The st. and branches are indeed woody or suffrutescent downwards, but the pl. is notwithstanding truly annual or only accidentally of longer duration in Madeira.

13. Draba L.

1. D. muralis L.

Root simple; st. leafy puberulous; l. hairy-pubescent ovate amplexicaul toothed, root-l. narrowed downwards forming a rose-like tuft; pedic. spreading as long or nearly twice as long as the 8–16-seeded smooth erecto-patent pouches.—Desf. ii. 65; Brot. i. 559; EB. t. 912; DC. i. 171; Sm. E. Fl. iii. 161; Koch 70; Bab. 29.—Herb. ann. Mad. reg. 3; rr. Rocky banks in ravines: Rib. de Santa Luzia close below the Waterfall; Rib. Frio by the Fountain. April, May.—Very variable in luxuriance with an erect slender st. 4–18 in. high often simple, but properly, as in more robust pl., branched sparingly from the base. Whole pl. more or less stellato-pubescent. Fl. small and inconspicuous white; pet. obovate entire but little longer than the erect always (in Madeira) hairy sep. Style very short scarcely any. Pedic. filiform subpuberulous. Pouch elliptic 1–2 lines long, the length or only half the length of its pedic., quite smooth.

Suborder III. SILICULOSÆ ANGUSTISEPTÆ.

Tribe V. *Thlaspideæ*.

14. Thlaspi L.

†1. T. arvense L. **Penny Cress. Mithridate Mustard.**

St. very erect branched at top, l. oblong toothed sagittate sessile; rac. in fr. elongated; pouches shorter than their stalk orbicular broadly winged, seeds arcuato-ribbed or striate several in each cell.—EB. t. 1659; DC. i. 175; Sm. E. Fl. iii. 171; Presl 61; Koch 73; Bab. 30.—Herb. ann. Mad. reg. 1, 2; ⅕.—In Yam-(*Colocasia antiquorum* Sch.) beds, S. Vicente, Serra d'Agoa, &c. May–Aug.—Altogether smooth. St. 6–12 in. high stiffly erect and straight branched only at top or upwards, often simple.

Root-l. obovate. Fl. white very small and inconspicuous. Pouches very large and numerous erect deeply notched at top. Seeds brown shining beautifully ribbed and grooved spirally, biting in taste like Mustard with a strong flavour of Garlic.

15. Teesdalia R. Br.

1. T. nudicaulis (L.) R. Br.

Pet. unequal.—Sm. E. Fl. iii. 170; Koch 75; Bab. 31. *T. Iberis* DC. i. 178. *Iberis nudicaulis* L., Brot. i. 570; EB. t. 327. *T. caulescens* Reichenb. in Holl's List, Hook. Bot. Misc. N. Ser. i. 21, 41.—Herb. ann. Mad. reg. 3, 4; ccc. Mountain pastures in moist or shady places everywhere above 2500 ft. up to the summits of the highest peaks. April–Aug.—A small insignificant stemless pl. consisting of a tuft of l. with many short mostly unbranched flowering st. or scapes from the crown of the root, and altogether smooth or only now and then with a few scattered hairs. L. numerous in a rose-like tuft mostly pinnatilobate or lyrate, sometimes undivided and spathulate. Scapes several soon becoming numerous 2–4 in. long; at first simple leafless, each with a terminal dense corymb of small white hexandrous fl., later in the season often sparingly 1- or 2-branched with a small leaf at each subdivision, constituting *T. caulescens* Reich., of which I have one of Herr Holl's original specimens gathered "at a little spring near the top of Pico Ruivo" in Aug. 1827. Pet. scarcely longer than the sep.; the 2 outer largest. Stam. 6 with large petal-like scales at their base. Pouches deeply notched spreading, about the length of their pedicels.

2. T. Lepidium DC.

Pet. equal.—DC. i. 178. *T. regularis* Sm. *Lepidium nudicaule* L., Brot. i. 566. *Thlaspi nudicaule* Desf. ii. 67 (var. *a*).

β. integrifolia DC. l. c.; l. simple entire spathulate or lanceolate.—Herb. ann. PS. reg. 1; rrr. Sand-rocks very sparingly on the right hand at the mouth of the Serra de Fora (Porto dos Frades) close to the beach. March, April.—A small insignificant inconspicuous pl. 3 or 4 in. high with several slender erect or spreading sparingly branched and leafy altogether smooth stems. L. principally radical, all simple or undivided elongato-spathulate or lanceolate and more or less acute, attenuated downwards into long stalks. Pouches orbicular notched, about twice the width of the narrow lanceolate septum, shorter than their horizontally spreading pedic.; each cell 2- sometimes 3-seeded. Seeds very minute tawny oval compressed but not bordered. Cot. accumbent.—The few pl. observed were quite out of fl. and nearly burnt up when discovered early in May.

But the slender decidedly branched stems, and laxer not cespitose habit, not to speak of the peculiar locality, forbid their reference to any state of the common Madeiran *T. nudicaulis* L. which is never found below 2000 ft.

Tribe VI. *Lepidineæ.*

16. Lepidium L.

1. L. virginicum L.

L. all undivided sharply inciso-serrate smooth, root-l. oblong-spathulate, st.-l. lanceolate, the uppermost linear-lanceolate; stamens 2–4, style very short; pouches orbicular notched keeled winged upwards spreading about the length of their pedicels.—DC. Syst. ii. 538; Prod. i. 205; Buch 196. no. 306. (*L. Iberis* Schk. not Linn.) DC. *Cynocardamum virginicum* WB. i. 97. —Herb. ann. (occasionally bien.) Mad. reg. 1, 2; ccc. Roadsides, sunny waste ground and dry beds of ravines, a universal weed; throughout the year. St. stiffly erect and straight about a ft. high often woody and suffrutescent at the base; branches slender stiff and rigid somewhat tough woody downwards minutely puberulous substriate. L. about an inch long narrow, the root-l. broader soon disappearing. Fl. very small and inconspicuous white; pet. often not unfolding spathulate obtuse. Seeds light tawny yellow compressed partly pellucid-bordered reticulato-punctate. Cotyledons accumbent.

No dependence can be placed upon the cot. in this pl. which vary from accumbent to incumbent. DC. in his *Systema* originally described them as incumbent. Webb finding them accumbent in his Canarian, Madeiran, N. American, and Porto Rican (Wydler's) specimens, was led to form his genus *Cynocardamum*: stating however the cot. to be "all incumbent in a most closely allied if not altogether identical" Mexican sp. from Berlandier.

†††2. L. sativum L. **Cress.**

Lower l. stalked variously cut and lobed pinnate or bipinnate, upper l. sessile linear undivided; pouches orbicular or oval winged obtuse notched close-pressed to the st.—Brot. i. 567; DC. i. 204 (var. *a*); Koch 77 (var. *a*); Bab. 32. *Lepia sativa* (Desv.) Presl 83.—Herb. ann. Mad. reg. 1, 2; rr. Occasionally in the neighbourhood of Funchal in waste ground amongst vineyards &c.; a mere outcast from gardens. March, April.—Pl. 1–2 ft. high much branched and leafy smooth more or less glaucous. L. deeply and much divided with narrow linear

lobes; sometimes entire. Fl. small white very numerous in long erect racemes. Style scarcely any. Cot. often tripartite. Cultivated for early salads with *Sinapis alba* L. frequently in Europe.

17. Capsella Med.

1. C. Bursa-pastoris (L.) Moench. **Shepherd's Purse.**

Pubescent; root-l. lanceolate runcinate-pinnatifid or undivided, those of the st. sessile sagittate and toothed, the uppermost undivided; pouch triangular-obcordate.—EB. t. 1485; DC. i. 177; Presl 86; WB. i. 98; Koch 79; Bab. 33. *Thlaspi Bursa-pastoris* Desf. ii. 68; Brot. i. 568; Sm. E. Fl. iii. 173.

γ. *pinnatifida* Koch l. c.; fl. regular, root-l. pinnatifid. Herb. ann. Mad. reg. 1, 2, c.; PS. reg. 2, r. Roadsides about Funchal, Dec.–Apr. and PS. at Camacha, Apr. Very variable in foliage; st. erect branched 6–12 in. high. Root-leaves in a flat rose-like tuft either undivided and lanceolate (var. γ. DC.; α. Koch), sinuate-toothed (var. β. Koch) or, as in Madeira and Porto Santo, pinnatifid (var. γ. Koch): but these three forms seem scarcely worth distinguishing. Pouches smooth on erecto-patent or spreading stalks of about their own length in long branched racemes, each 3 lines long and 2 broad at top, their cells each with from 10 to 14 seeds.

Tribe VII. *Senebiereæ*.

18. Senebiera Pers.

1. S. Coronopus (L.) Poir. **Swine's Cress.**

Smooth; l. fleshy unequally and coarsely pinnatilobate, lobes entire or incised on their fore-edge; *pedic. shorter than the fl.; pouch altogether closed not bursting, undivided reniform compressed crested and toothed at the back* tipped with the pyramidal prominent style.—DC. i. 203; Sm. E. Fl. iii. 179; Presl 81; Koch 80; Bab. 33. *Coronopus Ruellii* Brot. i. 565; EB. t. 1660; WB. i. 96. *Cochlearia Coronopus* L.—Herb. ann. Mad. reg. 1; $\frac{c}{2}$. Streets and roads about Funchal, Jan.–Apr.—St. short branched prostrate and with the l. lying flat to the ground. L. light or dark full not at all glaucous gr. Fl. small white in short close lateral corymbs. Pouches in dense clusters large in proportion and of singular appearance, not bursting or splitting asunder, of a somewhat corky or leathery substance, not distinctly 2-lobed. Pl. when bruised fetid.

2. S. didyma (L.) Pers.

St. hairy; *l. regularly and elegantly pinnatilobate* flattened, lobes oblong toothed or cut at their fore-edge; *pedic. longer than*

the fl.; pouch compressed *deeply and distinctly 2-lobed granulate or reticulato-rugose widely notched at the top and bottom, the lobes turgid splitting asunder* but not discharging the seeds, *style very short.*—Sm. E. Fl. iii. 180; Koch 80; Bab. 33. *Lepidium didymum* EB. t. 248. *S. pinnatifida* DC. i. 203; WB. i. 95. *Coronopus didymus* Spr. Syst. ii. 853.

β. *pinnatifida* DC. l. c.; lobes of l. 3–4-partite.—Herb. ann. Mad. reg. 1, 2, ccc.; PS. reg. 1, 2, c. Roadsides, streets, on walls, in waste ground in Madeira everywhere; less common in PS.; has not occurred in the Dezertas. Jan.–June.—St. at first prostrate then procumbent or diffuse a foot long or more and with the fl.-stalks more or less hairy, the rest of the pl. mostly smooth. L. dark green elegantly pinnate and flattened, the lobes usually deeply 3-toothed in front. Fl. white very small and numerous in dense rac. abundantly produced opposite the l. often apetalous and diandrous. Pouches pale green or yellowish erecto-patent deeply and widely notched, the lobes joining only in their middle and easily separating. Pl. fetid when bruised.—In a young state growing between the stones in a dry paved road it assumes sometimes a very peculiar and anomalous appearance, producing little sessile whitish or hoary and woolly globose rooting buds (gemmæ or stolons) much resembling the flowering heads of *Trifolium tomentosum* L. or *T. resupinatum* L.

Suborder IV. SILICULOSÆ NUCUMENTACEÆ.

Tribe VIII. *Isatideæ.*

19. Isatis L.

†1. I. præcox Kit. *Pastel.*

More or less glaucous and hairy-pubescent; lower l. stalked oblong, upper l. sessile sagittate; pouches smooth oblong or slightly fiddle-shaped obtuse or rounded at each end, rarely or but slightly narrowed or attenuated at the base, twice as long as broad, tumid and corky towards the margins which are slightly winged.—DC.! Syst. ii. 568; Prod. i. 210. *I. tinctoria* γ. *præcox* Koch 81. *I. banmatica* RFG. ii. t. 4. f. 4177 *b*. *I. tinctoria* Buch! 196. no. 322 (not Linn.).—Herb. ann. Mad. reg. 1, 2; ccc. Waste rocky ground in sunny places everywhere, especially near the sea. Spr.; but at almost all seasons.—St. 2–3 ft. high very erect virgate branching upwards into a large panicle. Lower l. large generally crenate and waved, upper more entire. Fl. small very numerous and with the smaller subdivisions and uppermost bracts of the large spreading panicle bright golden-y. Pouches pendulous, in all stages smooth, shining violet or steely blackish, rarely somewhat cuneate and

always nearly if not quite half as broad as long, *i. e.* not quite half an in. (10–11 millim.) long, $\frac{1}{4}$ in. (4 or 5 millim.) wide, tumid and corky towards the edges, scarcely or but very narrowly winged, imperfectly bursting and discovering in the middle the single pendulous large oblong seed, not separating.—Varies not only greatly in size, height and foliage, but in being (1) more hairy and less glaucous, (2) nearly or quite smooth and very glaucous, (3) pouches truncate or rounded at top, and sometimes a little narrowed or attenuated, though scarcely cuneate or wedge-shaped, at the base: but all these forms are too much blended together to be separable. And although the pouches vary thus in shape a little from their normally oblong character, the proportion of their greatest width to their length is quite constant, even in the most cuneate forms, in which the upper tranverse diameter manifestly exceeds the lower or basal. —United by Koch to *I. tinctoria* L., but more nearly perhaps related to *I. alpina* All.; the pouches being of precisely the same shape, only considerably smaller. Still in *I. alpina* All. the pouches are not only 15–16 millim. long and 8 wide, but they are also altogether thicker, though neither tumid or corky towards the sides, nor more distinctly winged than in *I. præcox* Kit.—*I. præcox* RFG. ii. t. 4. f. 4178 does not seem to differ materially from f. 4177, which is the true *I. tinctoria* L. But the fig. 4177 *b*, "*I. bannatica* Link," exactly represents the fruit of the Madeiran plant. By Steudel both *I. bannatica* Link and *I. bannatica* Kit. are referred to *I. tinctoria* L., in which the pouches are not only finely attenuated downwards into the stalk, but are uniformly at least three times as long as broad.

Occasionally used for dyeing blue by the country people, but now almost superseded. Formerly it was much cultivated for commerce, but it is now quite neglected: and though extensively and perfectly naturalized in Madeira, its non-occurrence in Porto Santo and especially in the Dezertas is a fact (considering its favourite places of growth) opposed to its being truly indigenous.

Suborder V. LOMENTACEÆ.

Tribe IX. *Cakilineæ.*

20. Cakile Tourn.

1. C. maritima Scop. *a.* DC.

L. fleshy sinuato-pinnatifid, the lobes toothed; upper joint of the pod 2-edged ensiform acute.—DC. i. 185, var. *a*; Sm. E. Fl. iii. 183; Presl 69; Koch 83, var. *a*; Bab. 34. *Kakile maritima*

Desf. ii. 77. *Kakile Serapionis* Brot. i. 561. *Bunias Cakile* L. EB. t. 231.—Herb. ann. PS. reg. 1; cc. Sandy beach in front of the town abundantly. Apr.–June. Pl. altogether smooth and fleshy, 6–12 in. high or more, with numerous flexuose spreading hard stiff branches forming a close often pyramidal bush. Foliage light gr. not glaucous. Fl. handsome pale lilac rather large in rac. opposite the l. or terminal. Pods an in. long, hard and woody, sharply quadrangular, beak compressed.

Tribe X. *Raphaneæ*.

21. Rapistrum Boerh.

1. R. rugosum (L.) Berg. *Rinchaõ.*

Root annual; branches widely and stiffly patent or divaricate; l. toothed, the lower oblong obtuse lyrate or lyrate-pinnatifid, sometimes undivided and merely sinuate, the upper l. acute; pouches pubescent hispid or smooth many-ribbed, upper joint ovate then globose strongly granulato-costate or rugose, equal to or shorter than the elongated conico-subulate style, lower joint clavate.—WB.! i. 86; Koch 83.—Var.

a. eriocarpum Webb l. c.; pouches hispid-pubescent, lower l. lyrate obtuse.—*R. rugosum* DC.! Syst. ii. 432; Prod. i. 227; Presl 107; RFG. ii. t. 2. f. 4168. Varr. silic. hirsutis (*R. hirsutum* Host) and silic. scabris (*R. scabrum* Host) Koch l. c. *Myagrum rugosum* L.! *M. perenne* Buch! 195. no. 304. Madeira, Fr. Masson, 1777, in BH.! (not Linn.) *Cakile rugosa* Spr. Syst. ii. 852.—Herb. ann. Mad. reg. 1; cc. PS. reg. 2; r. GD., reg. 2; c. Waste sunny places and cornfields chiefly near the sea. Abundant to the westward of Funchal about the Gorgulho, Praya Formosa, &c. Ponta S. Lourenço about the fossil bed, &c. Less common in Porto Santo than var. *β*. March–May.—Root subfusiform strong tough and woody, perennial-looking, but always decidedly annual only. Pl. 1–2 ft. high with remote straggling divaricate very tough and stiff or rigid branches, and small scanty foliage. L. not above 2 or 3 in. long and 1 broad, principally radical in a flat rose, with the st. more or less hispid, the latter retrally strigose. Rac. in fruit much elongated and divaricated or declining. Fl. rather smaller than in *Sinapis arvensis* L., bright y. Sep. smooth. Pedic. very short erect closely adpressed in fr. Pouches when young densely hispid; in all stages and even when ripe more or less pubescent all over, corky, coarsely ribbed and rugose longitudinally, 3–5 lines long, the lower joint rarely seedless not longer than the pedic., as long as the upper globose joint which is strongly ribbed longitudinally and tipped by the slender conic-subulate style which is as long as or longer than the

joint; the ribs more or less broken into irregular coarse warts or granules.—The pubescence of the fruit affords a very obvious but the only well-marked or perhaps altogether permanent distinction between this and var. β. The two however grow continually intermixed; so that the differences between them cannot be ascribed to soil or situation.

β. *leiocarpum* Webb l. c.; pouches smooth, lower l. sinuate-toothed acute.—*R. rugosum* var. silic. glabris (*R. glabrum* Host) Koch l. c. *R. glabrum* (Host) RFG. ii. t. 2. f. 4171. *R. orientale* Presl 107 (not DC.). *Myagrum hispanicum* Brot. i. 563 (not Linn.). *M. clavatum* Poir. ex Webb l. c. *Rapistrum clavatum* DC. Syst. ii. 433; Prodr. i. 227.—Herb. ann. Mad. reg. 1, c; PS. reg. 2, cc; GD. reg. 2, c. Waste ground and cornfields with α; but the commoner of the 2 varr. in Porto Santo, though rather the rarer in Madeira. March–May.—Habit, size and general characters precisely as in α: but besides the smoothness of the fr. from its earliest stage, the lower l. are more acute and not lyrate but merely sinuate and toothed. In one Porto-Santan specimen the l. however are decidedly lyrate or pinnatifid, and the pl. is altogether smoother and the root more woody or perennial-looking than usual; the pouches being also merely ribbed and not verrucose or rugose, though with the ordinary slender elongated style.—*R. perenne* (L.) Berg. and *R. orientale* DC. with which α. and β. have often been respectively confounded, are both much taller larger more robustly growing and more upright pl., 2 or 3 ft. high or more, with long erect not straggling patent or deflexed branches, and much larger foliage: the l. in *R. perenne* L. being 6–8 in. long, lyrate-pinnate, with 3 or 4 pairs of pinnæ and a large terminal lobe; and in *R. orientale* DC. a foot long, very obtuse, and merely sinuate with obtuse lobes and sinuses. In *R. perenne* also the root is decidedly perennial, sending up fresh stems annually from the old woody stock, which is never the case even by accident with the Madeiran pl.

22. Crambe L.

1. C. fruticosa L. fil.

Shrubby hoary-pubescent and harshly strigose; l. scabrous harsh and stiff sinuate-pinnatifid or lyrate, coarsely unequally and sharply toothed grey or glaucous; panicle corymbose open spreading, its branches forked elongated slender smooth, the fl. numerous and crowded at their ends; pouch reticulato-rugose ovate-mucronate subcompressed more or less quadrangular.—Var.:

α. *pinnatifida*; l. sinuato-pinnatifid, all the lobes acute and inciso-dentate; panicle large compound corymbose.—*Crambe*

fruticosa DC. i. 226. *Myagrum scabrosum* Buch! 195. no. 305. *M. scabridum* Sol.! in BH.—Shr. per. Mad. reg. 2: r. Dry sunny rocks and cliffs on the S. coast, as on the edge of the Cabo Giraõ or of Pico de Facho beyond Camera de Lobos; more rarely in ravines, as nearly at the bottom of the Curral das Freiras down the Voltas on the high rocks to the right of the road above the Church. March–July.—A low shrub 2 or 3 ft. high with stiff fragile straggling crooked branches. L. ovate-oblong 1–2 in. long and ½–1 in. wide. Panicle large corymbose; its branches thin stiff and naked; the fl. white middle-sized crowded in dense racemes towards their ends, smelling rather disagreeably. Longer fil. often forked or toothed. Fr. dark brown the upper seed-bearing joint ovate tipped with the style, about a line long, soon and easily falling or separating from the short minute stalk-like quadrangular strongly corrugated lower barren joint.

β. brevifolia; dwarfish stunted, sparingly or not branched; l. short roundish or oval obtuse thick and fleshy toothed but nearly simple with only a pair of very small inconspicuous auricles at the base; panicle scarcely or not at all corymbose, of few simple or sparingly divided branches.—Shr. per. Mad. reg. 1, r; PS. reg. 4, rr; ND. 1, rr; GD. 1, r; SD. 1, c. Sea cliffs; Mad. at Paul do Mar above the Waterfall, at Ponta de Pargo &c.: Porto Santo on the rocky summit of Pico d'Anna Ferreira. May–July.—Merely the maritime form of *a*, with all the usual variations characteristic of its locality. Fl. and fr. rather larger than in *a*.

The Canarian *C. strigosa* from authentic specimens in the BH. is very distinct in its greater size, large ovate finely toothed l. 4 or 5 in. long and 2 or 3 broad, large ample elongated not at all corymbose panicle with the fl. thinly scattered, few together, and not more than half the size of those of *C. fruticosa*. The whole pl. is devoid of hoary fine pubescence, but sprinkled with conspicuous long coarse bristles. The greater or less development of the tooth of the longer filaments is equally variable in both sp.

23. Raphanus L.

†††1. R. sativus L. Radish. *Rabaõ.*

Pods oblong rounded tapering acuminate continuous or sometimes strangulated here and there scarcely longer than their stalks spongy and 2-celled within; seeds reticulato-rugulose.—Brot. i. 574; DC. i. 228; WB. i. 84; Koch 84.—*a. rotunda*; root fleshy globose red purple pink or white: *R. sativus* A.

α, DC. l. c.; *R. Radicula* Presl 108.—*β. oblonga*; root oblong or fusiform, at first fleshy purple red or white, then slender woody or fibrous: DC. l. c.; Presl l. c.; *R. sativus β. sylvestris* Koch 1019.—Herb. ann. Mad. reg. 1, 2; r. Cult. and in waste ground and vineyards about Funchal, &c. occasionally, escaped from gardens. Nov.–March.—St. branched erect 2–3 ft. high. Lower l. lyrate, upper lanceolate; all somewhat hispid. Fl. pale lilac with darker veins. Seeds large angular beautifully reticulato-punctate.

2. R. Raphanistrum L. *Saramago.*

Pods linear slender tapering acuminate moniliform or strangulated between the seeds 1-celled and longitudinally ribbed or striated when ripe; seeds even.—Brot. i. 574; DC. i. 229; Sm. E. Fl. iii. 226; WB. i. 84, 5; Koch 84, 1019; Bab. 34.—Herb. ann. Mad. reg. 1, 2; ccc. PS. 1, 2; r. Cornfields waste ground and by roadsides in Madeira everywhere but especially from 1000 to 2000 ft. March–June chiefly but at almost all seasons.—Hispid dark green, st. glaucescent diffusely spreading or straggling 1–2 ft. long. Root slender fibrous. L. lyrate toothed, terminal lobe large. Fl. rather large. Sep. erect soon turning purplish. Pods smooth about an inch long, 2–4 times as long as their subulate acuminate smooth or adpresso-pubescent beak, when ripe breaking across between the seeds as if jointed, 2-celled whilst very young but the longitudinal dissepiment soon obliterated, the seeds becoming imbedded in a spongy mass.—Var.:

α. DC., Koch l. c.; fl. white with blackish violet veins giving them a bluish tint.—Not common. About S. Amaro and S. Martinho intermixed with *β.* and equally abundant.

γ. DC., Koch l. c.; fl. pale dull yellow (ochroleucous) or straw-colour with darker or dusky (not violet) veins.—EB. t. 856. Common everywhere. The fl. become deeper y. ascending from the sea.

Order VI. RESEDACEÆ.

The Mignonette Family.

Fl. irregular. Cal. 4–6-partite persistent. Cor. irregular, pet. 4–6 unequal alternate with the sepals deciduous. Stam. indefinite numerous, fil. free or variously united, inserted on a glandular fleshy flat collar-like or ruff-like irregular unequally dilated disk broadest and scale-like on the upper side. Ovary 3–6-lobed, 1-celled, multiovular, with 3–6 parietal placentas and 3–6 stigmas. Fr. a 1-celled many-seeded caps. open from an early stage at the top and exposing the seeds; rarely of 3–6

few-seeded follicles. Seeds kidney-shaped; embryo curved mostly exalbuminous.

1. RESEDA. Pet. unequal entire or variously laciniate. Stam. 10–24. Styles 3–6. Caps. 3–6-angular.

1. RESEDA L.

†1. R. LUTEOLA L. **Dyer's Weed or Weld.** *Lirio.*

St. erect; l. undivided elongato-lanceolate entire with usually a single small toothlet on each side at their base; cal. 4-cleft.—Desf. i. 373; Brot. ii. 305; Buch 196. no. 323; EB. t. 320; Sm. E. Fl. ii. 347; Presl 112; Koch 97; Bab. 35.—Herb. ann. or bien. Mad. reg. 1, 2, cc; PS. reg. 1, 2, c; ND. r, or $\frac{c}{2}$; GD. c. Open waste ground everywhere. Spr., Sum.—Whole pl. smooth and shining. St. virgate branched 1–3 ft. high. L. undulate dark green. Fl. scentless pale greenish-ochroleucous, in long terminal erect tapering racemes densely crowded and spicate upwards. Pet. 3–5, the 3 upper laciniate. Caps. verrucose or granulate 6-valved 3-cuspidate, the points of the alternate valves inflexed.—Used by the country people to dye woollen yellow or green.—*Luteola tinctoria* var. *australis* WB.! i. 106 by Bourgeau's spec. in HH. and BH. seems to be merely a trifling accidental form or more branched state of the common pl. such as I have seen in Madeira produced by the cropping or browsing down of the main st. before flowering.

Order VII. CISTACEÆ.

The Cistus Family.

Fl. regular. Sep. 5 persistent unequal, the two outer larger or smaller sometimes wanting, 3 inner twisted in æstivation. Pet. 5 equal fugacious crumpled and twisted contrariwise to the sep. in æstivation. Stam. numerous free. Stigma capitate. Ovary free. Fr. a 3-, 5- or 10-valved 1–many-locular many-seeded capsule. Embryo spiral or curved within the farinaceous albumen.

1. CISTUS. Sep. 5, the 2 outer larger or smaller or 0. Pet. 5 fugacious. Caps. 5- or 10-valved.—L. opposite without stip.

1. CISTUS L.

†1. C. MONSPELIENSIS L. *Alecrim de Fora.*

L. sessile linear-lanceolate 3-nerved reticulato-rugose villous on both sides, presently smooth; fl. in villous viscous secund corymbose racemes, stigma nearly sessile.—Brot. ii. 260; Desf.

i. 409; Buch! 196. no. 344; DC. i. 265; Presl 117; Koch 85. *Stephanocarpus monspeliensis* (Spach) WB. i. 124.—Shr. per. Mad. reg. 2; rrr. In waste spots in a red clay-tufa soil by a roadside (Caminho de Joaõ Bouto) from $\frac{1}{4}$ to $\frac{1}{2}$ a mile above or beyond the church of S. Antonio near Funchal. Here it was gathered by Masson long ago according to specimens in the BH. marked "Madera prope Templum S^{ti} Antonii, Fr. Masson;" and to this spot it seems confined. March, April.—A low bushy shrub 2 or 3 ft. high with a profusion of snow-white fl., the size of those of *Ranunculus acris* or *bulbosus* L., contrasting with its dark green foliage which is scented like Peruvian Bark (*Cinchona*). L. 1 or 2 in. long with revolute margins, nearly sessile, at first hairy on both sides, ultimately smooth and shining on the upper. Fl. 5–10 slightly fragrant, in copious short racemes which are 1 or 2 in. long glutinous and densely villous; the 2 outer sep. more leafy narrow and acuminate than the 3 inner; pet. pure white, their claw yellow. Caps. small brittle smooth 5-valved bursting at the top, imperfectly 5-celled many-seeded.

Order VIII. VIOLACEÆ.

The Violet Family.

Fl. mostly irregular. Sep. 5 usually persistent. Cor. unequal or irregular. Pet. 5 marcescent rarely deciduous. Stam. 5, anthers introrse connivent or cohering round the ovary, sessile in the middle of the short dilated fil. which is produced above the anthers into a dry membranous point or crest. Ovary 1-celled with 3 parietal placentas. Style persistent thickened upwards with an oblique hooded stigma. Caps. 1-locular 3-valved loculicidal. Seeds often carunculate or subarillate. Embryo straight erect in the axis of the fleshy albumen.—Leaves with persistent stipules.

1. VIOLA. Sep. unequal produced downwards at the base. Pet. unequal, the hinder or lower one produced behind into a hollow spur. Stam. approximate into a cone or cylinder, but free; the two lower spurred at the base.

1. VIOLA L.

Sect. 1. *Nomimium* Ging. in DC.; the 4 upper pet. spreading irregularly sideways; the 2 side pet. generally bearded inside downwards: the 2 upper naked. Style slightly flexuose thickened or dilated upwards, constricted at the base.—Rhizome oblique or creeping; the later fl. apetalous.

* Stigma hooked attenuated into a deflexed beak. Fruit-stalks prostrate. Summer-l. large and fl. apetalous.

1. V. ODORATA L.

Stemless or shortly caulescent; *summer shoots creeping stoloniferous*; l. all broadly ovate rounded deeply cordate, more or less pubescent on both sides, on long *deflexedly pubescent stalks*; stip. altogether smooth ovate- or oblong-lanceolate acuminate ciliato-serrulate or fringed with glands much shorter than the breadth of the stip.; *br. above the middle of the ped.*; sep. smooth or pubescent at the edges only, oblong mostly obtuse; spur straight obtuse; fruitstalks deflexed or prostrate deflexedly pubescent; caps. short globose pubescent.—Desf. ii. 313; Brot. i. 305; EB. t. 619; DC. i. 296; Sm. E. Fl. i. 301; Presl 132; Koch 90; Bab. 37.—

β. maderensis. Violêta.

Somewhat more decidedly caulescent or suffrutescent and pubescent than the common English pl.; ped. always deflexedly pubescent; sep. smooth subacute; fl. paler violet than in the E. pl., never white, highly fragrant, the 2 side pet. very slightly bearded; spur mostly very obtuse; anthesis subperennial, stolons flowering together with the mother-pl.—*V. odorata* Buch 196. no. 345; WB. i. 110. *V. odorata* L. var. Webb in Ann. des Sci. xiii. 138, 9. *V. maderensis* Prim. 36.—Herb. per. Mad. reg. 2, 3; ccc. In woods and shady places above 1000 ft. everywhere, *e. g.* the Mount, Camacha, S^{ta} Anna, S. Vicente, &c. Oct.–June.—Probably the origin of the "Perpetual Violet" of English gardens.

** Stigma hooked attenuated into a deflexed beak. Fruit-stalks erect, caps. drooping.—Summer-shoots annual not rooting or stoloniferous, with shorter-stalked l., smaller stip., and often apetalous fl.

2. V. SYLVESTRIS Lam. **Round-leaved Dog Violet.**

Nearly or quite smooth shortly caulescent, *summer-shoots ascending or procumbent*; *l. shortly and broadly cordate* simply acute or pointed, the lower orbicular or reniform and more obtuse, the upper more ovate or distinctly acute; stip. of ann. st. fimbriate-ciliate narrow attenuato-acuminate, the intermediate half as long as the slightly margined petiole, the upper as long as or longer than the same; sep. very narrow attenuato-acuminate; *caps. oblong or elliptic acute apiculate.*—Lam. Fl. Fr. ii. 680; RIB. Cent. 1. t. 94. ff. 200, 201; Cent. 7. t. 601. f. 822; RFG. iii. t. 12. f. 4503; Koch 91. *V. sylvatica* (Fries) Bab. 37. *V. canina* EB. t. 620; DC. i. 298; WB. i. 110 (not Linn.).

β. Riviniana Koch l. c.; fl. larger and paler, spur mostly pale or whitish. *V. Riviniana* RIB. l. c. t. 95. f. 202, 203; t. 601.

f. 821; RFG. l. c. f. 4502.—Herb. per. Mad. reg. 3; cc. Dry rocks and sunny banks above 2000 ft. general; *e. g.* about the Torre de Luta and Arrebentaõ above the Mount, at the Portella of Porto da Cruz, the Encumeado de S. Vicente, &c. Nov.–July.—Pl. quite smooth, early in the season with short subcespitose suffrutescent st. and tufts of small cordate orbicular scarcely pointed l., producing numerous fl. in long succession, and throwing out, as the spring advances, several trailing but never-rooting shoots, 6–12 in. long, bearing more cordate-ovate larger l. and smaller sometimes apetalous or imperfect fl. Primordial fl. larger and much handsomer, but much paler and clearer blue than in *V. odorata* L. var. *β. mad.*, scentless, never white. Pet. varying in shape from very broad and oval or rounded to oblong or ligulate. Spur white or pale, obtuse, varying much in length.—L. crenate mostly as broad as long, varying much in size but not in shape except in being more or less ovate and pointed, yet never assuming the isosceles-triangular form of those of the true *V. canina* L. Early in the year or in dry exposed situations starved dwarf pl. with very small rounded l., $\frac{1}{4}$–$\frac{1}{2}$ in. diam., and large fl. with often short broad almost orbicular pet., exactly represent *V. flavicornis* Forst. (not Smith) in EBS. t. 2736 (*V. canina γ. pusilla* Bab. ed. 1. p. 34).—The modification *sylvatica* of the original name *sylvestris* would be very inappropriate to this *Viola* in Madeira, where it is generally found in open sunny places and not at all in woods.

Sect. 2. *Melanium* DC.; the 4 upper pet. ascending imbricated, the 2 uppermost more or less erect, the 2 side pet. and the lowest bearded inside at the base. Style ascending, expanding upwards into the large urceolate stigma labiate below with a tuft of hairs on each side.

3. V. PARADOXA Lowe.

St. suffrutescent branched cespitose procumbent or ascending, in flower elongated suberect diffuse; l. ternate crenate shining on long slender marginate petioles, the lower quite smooth rounded or ovate and cordate or truncate at the base, the upper subpuberulous spathulate or lanceolate; stip. simple entire spathulate ligulate or linear; sep. oblong-lanceolate entire thickly ciliato-pubescent; spur obtuse much shorter than the sep. or pet., longer than the basal calyx-lobes; anther-spurs not half the length of the stam.; caps. obsoletely 6-angular smooth.—Novit. 28 or 550.—Herb. per. Mad. reg. 4; rrr. Highest bare rocky mountain peaks: Pico dos Arrieiros and the neighbouring peaks. May–July.—An elegant little pl. smooth below, finely mealy-puberulous upwards; l. shining dark green, very small and elegant, from $\frac{1}{4}$ to $\frac{1}{2}$ an inch long or

broad, on slender petioles an inch long, before flowering crowded in tufts at the ends of the naked prostrate ascending branches, which are lengthened out when flowering often a foot or more, diffusely straggling, and producing from 2 to 6 or 8 fl. Fl. subcorymbose scentless large conspicuous bright full y., like those of the common garden Pansy, *V. tricolor* L., but less flat and regular, ¾ to 1 inch in diameter. Lower ped. elongated puberulous, upper shorter and with the br. and pedic. mealy-pubescent. Sep. acute puberulous, ciliato-pubescent at the edges. Claw of all the pet. pubescent; the 3 lower streaked and bearded inside at the base. Seeds from 15 to 20 ovate pale yellowish.

An exact representative and near ally of the European *V. calcarata* L.

†4. V. TRICOLOR L. **Wild Heartsease or Pansy.**

St. diffuse ascending branched; l. deeply crenate, the lower ovate-cordate, the upper ovate-oblong or lanceolate, stip. large lyrate-pinnatifid, their terminal lobe large ovate-oblong or lanceolate crenate.—DC. i. 303; EB. 1287; Sm. E. Fl. i. 305; Presl 134; Koch 94; Bab. 39.

β. arvensis Sm., Presl, Koch, Bab. ll. cc.; fl. small inconspicuous, pet. scarcely longer than the cal. very pale y. almost w., the lower odd one y. and streaked at the base; spur obtuse about the length of the basal lobes of cal.—*V. tricolor* var. *a.* L., *κ.* DC. l. c. *V. arvensis* Brot. i. 306; EBS. 2712. *Mnemion tricolor* (Spach) WB.! i. 112.—Herb. ann. Mad. reg. 2; ♀. Cornfields, roadsides and waste ground here and there; about the Mount, Allegria, &c., near Funchal. March–Sept.—Shining and apparently smooth but more or less puberulous. St. 6–12 in. long angular often flexuose. Fl. varying in size, but never so large as in *a*, the larger blue-flowered var., which is not found except in gardens in Madeira.

Order IX. TAMARISCACEÆ.

The Tamarisk Family.

Fl. perfect regular. Cal. 5–4-partite persistent imbricate in the bud. Pet. 5 or 4 hypogynous regular imbricate in the bud, marcescent. Stam. 5–4 or 10–8, hypogynous free or monadelphous. Caps. 1-celled 3-valved many-seeded loculicidal, placentas often imperfect. Seeds ascending comose; embryo straight; albumen none.

Shrubby or small trees. L. cypress-like minute sessile scale-like alternate more or less imbricated entire, falling off together with the branchlets. Fl. small in dense terminal spikes or racemes, white or pink.

1. TAMARIX. Pet. 5 or 4. Stam. 5 or 4 inserted on a hypogynous ring. Styles 3 patent. Seeds affixed at the base of the caps. with a sessile coma or pappus-like pencil or tuft of simple hairs at the apex.

1. TAMARIX L.

†††1. T. GALLICA L. **Tamarisk.** *Tamagueira.*

Smooth not at all glaucous; l. keeled cordate-lanceolate or ovate-acuminate imbricate amplexicaul mostly narrowed and produced into a spur below the base; spikes lateral panicled, about four times as long as broad, cylindric-oblong, obtuse; fl. buds shortly globose-ovate or ovoid; hypogynous disk or ring fleshy irregularly 5-lobed, each lobe often indistinctly notched; fil. inserted in or behind the notch; anthers shortly apiculate; caps. pyramidate trigonal attenuated gradually upwards from the base.—Desf. i. 269; Brot. i. 475; EB. t. 1318; Sm. E. Fl. ii. 111; Fl. Gr. t. 291; DC. iii. 96; Koch 274. *T. anglica* Bab. 116. *T. gallica* and *T. anglica* Webb in Hook. Journ. of Bot. iii. 429, 430. t. 15. *T. canariensis* (Willd.) WB.! i. 171. t. 25. *T. senegalensis* DC. iii. 96.—Shr. or subarborescent per. Mad. reg. 1, rr, only in a few gardens, *e. g.* Quinta do Val; whence introduced in 1834 by S^{r} Joaõ Antonio Pedroso into PS. it is now almost naturalized, spreading over the whole island in reg. 1, 2, ccc. April–June.—A smooth reddish-barked shrub or low tree from 10 to 20 ft. high with red-barked numerous elegant feathery slender upright or slightly drooping branches, and minute cypress-like l. which when dry are distinctly punctate. Fl. pale rose or pinkish-white small in densely crowded lateral spikes about an inch long and $\frac{1}{4}$ inch broad forming large elegant subterminal drooping panicles. Sep. pet. and stam. 5; the latter scarcely longer than the oblong obtuse concave spreading pet. Anth. apiculate. Hypog. disk normally 8–10-lobed, the lobes united in pairs, often indistinct or obsolete. Caps. trigonal bulbous with an abrupt neck.—A most valuable acquisition to Porto Santo for fences and firewood.

Order X. FRANKENIACEÆ.

The Sea-Heath Family.

Fl. perfect regular. Cal. persistent; sep. 5 or 4 united nearly to the top into a long ribbed or furrowed 5-toothed tube. Pet. 5 or 4 marcescent with a long claw and the limb with a scale or appendage at its base. Stam. mostly 6 rarely so few as the pet. and then alternate; anth. roundish. Ovary free; style slender 2–3-fid. Caps. within the calyx-tube 1-celled 2–4-valved septicidal with 3 parietal placentas. Seeds minute

numerous. Embryo straight in the axis of the albumen.—L. without stipules.

1. FRANKENIA. Style 3-fid, the lobes oblong bearing the stigma on their inner side. Caps. 3–4-valved many-seeded.

1. FRANKENIA L.

Sea-Heath.

1. F. PULVERULENTA L.

Herbaceous diffuse or prostrate; l. obovate retuse smooth above, furry-pubescent beneath, petioles ciliate at the base; cal. smooth.—Desf. i. 316; Brot. i. 556; EB. t. 2222; DC. i. 349; Sm. E. Fl. ii. 186; Presl 140; WB.! i. 130; Bab. 41.—Herb. ann. Mad. reg. 1, rrr; PS. reg. 1, c/2. In Madeira only at Porto da Cruz on the N. coast near the sea, and "beach at S. Jorge," Sr Moniz; in PS. by roadsides, &c., not uncommon. April–June.—St. suffrutescent at the base, 6–12 in. long, much branched dichotomously, thickly leafy. L. small. Fl. small very pale pink or almost white, axillary.

2. F. LÆVIS L. *Resteira* or *Rasteyro.*

St. shrubby prostrate wiry thickly cespitose; l. linear stiff smooth on both sides sessile connate and subciliate at the base, their margins revolute; fl. solitary or collected in little terminal heads subcymose longer than the l.; cal. slightly hairy-pubescent at the base and between its ribs or angles.

a. hebecaulon; st. more or less velvety-pubescent. *F. lævis, hirsuta* and *Nothria* Linn. Herb.! *F. intermedia* and ?*F. hispida* DC. i. 349. *F. intermedia* Presl 141? *F. Nothria* (Thunb.) DC. i. 34. *F. hirsuta* Desf. i. 317, 8. *F. lævis* Brot. i. 556; Sm.! E. Fl. ii. 186; Bab. 41; Buch! 196. no. 351. *F. cespitosa* Lowe! Novit. 28. *F. capitata* WB.! i. 131. t. 16.—Suffr. per. Mad. reg. 1, r/2; PS. reg. 1, ccc. Confined in Madeira to Ponta S. Lourenço; in Porto Santo general in barren exposed places near the sea. April–June.—Much branched and leafy, trailing, forming a thick spreading turf 2 or 3 in. high, with tough thick woody long wiry roots and st., and heath-like crowded often encrusted l. 1/8 in. long and 1/2 line broad, enlivened by the conspicuous rather large pink fl. which are either sessile and solitary or aggregate in leafy cymose heads of 2–4 towards the ends of the branches. Cal. and st. upwards reddish or purplish chestnut. In foliage the pl. resembles *Empetrum nigrum* L.; in fl., *Silene acaulis* L. It varies with fl. bright full pink or rose; and fl. pale flesh-colour or nearly w.; the latter occurring only, and that rarely, in Porto Santo.

The var. *β. leiocaulon* with smooth st. (*F. lævis* Desf. i. 317; EB. t. 205; DC. i. 34; Presl 141) has not occurred either in Mad. or PS.

Order XI. CARYOPHYLLACEÆ.

The Pink and Chickweed Family.

Fl. regular sometimes imperfect. Sep. 5 or 4 connected into a tube or free, persistent. Pet. 5 or 4 with a distinct claw and often notched or bifid limb, sometimes abortive. Stam. mostly 10 or 8, sometimes 5 or 4, connected at the base or free. Ovary 1 often stalked. Stigmas 2–5 sessile filiform. Caps. 1- or imperfectly 2–5-celled, 2–5-valved, but usually opening at the top with twice as many teeth as stigmas, many-seeded; placenta central. Embryo annular or curved round the farinaceous albumen.—L. opposite without or rarely with stipules.

Suborder I. SILENEÆ.

Sep. connected into a tube 5–4-toothed at top. Stam. connected below into a tube and with the pet. inserted on the distinct more or less elongated stalk (gynophore or carpophore) of the ovary. Caps. stalked. Pet. marcescent.

1. Dianthus. Cal. 5-toothed clothed at the base with 2 or more imbricated opposite scales or bracts (except in *D. prolifer* L.). Pet. 5 with long linear claws. Stam. 10. Styles 2. Caps. 1-celled opening at the top with 4 valves. Seeds peltate, convex above, concave beneath and keeled.

2. Silene. Cal. 5-toothed naked. Pet. 5 with long linear claws. Stam. 10. Styles 3. Caps. more or less completely 3-celled opening at the top with 6 valves. Seeds reniform.

3. Agrostemma. Cal. 5-toothed naked; the teeth produced elongated leafy. Pet. 5 with long linear claws. Stam. 10. Styles 5; stigmas hairy, papillary on their inner side. Caps. 1-celled opening at the top with 5 teeth.

Suborder II. ALSINEÆ.

Sep. distinct. Stam. free inserted on a more or less distinct hypogynous ring. Caps. sessile.—Pet. often deciduous.

* *Valves of caps. as many as the styles.*

4. Sagina. Sep. 4 mostly spreading or 5 closed in fruit. Pet. 4, 5, or 0 entire. Stam. 4, 5, 10. Styles 4, 5. Caps. 4–5-valved many-seeded. Seeds reniform not winged.—L. without stip., connate at the base. (Sagina L. and Spergella Reichb.)

5. Spergula. Sep. 5. Pet. 5 entire. Stam. 5–10. Styles 5. Caps. 5-valved many-seeded. Seeds lenticular, their mar-

gin keeled or winged.—L. with scarious stip., free not connate at the base.

6. SPERGULARIA. Sep. 5. Pet. 5 entire. Stam. 10, the outer fil. with 2 short glands at their base. Styles 3. Caps. 3-valved many-seeded. Seeds either triangular or roundish-obovate compressed and apterous, or lenticular and keeled or winged.—L. with scarious stip., free not connate at the base. (LEPIGONUM Fr.)

** *Valves of caps. twice as many as the styles.*

7. ARENARIA. Sep. 5. Pet. 5 entire or retuse. Stam. 10. Styles 3. Caps. 6-valved many-seeded. Seeds reniform apterous.—L. without stip., connate at the base.

8. STELLARIA. Sep. 5. Pet. 5 bifid or bipartite. Stam. 10. Styles 3. Caps. 6-valved many-seeded.—L. without stip., connate at the base.

9. CERASTIUM. Sep. 5. Pet. 5 bifid or notched. Stam. 10, 5, 4. Styles 5, 4. Caps. cylindric tubular 10–8-valved or toothed at the apex many-seeded.—L. without stip., connate at the base.

SUBORDER I. SILENEÆ.

1. DIANTHUS L.

1. D. PROLIFER L.

Fl. in a dense close scaly head, involucral scales 6 membranous pellucid scarious elliptic, the 2 outer short and mucronate, the inner very obtuse equal to or a little longer than the cal.; st. smooth; l. linear smooth; seeds boatshaped granulate.—Desf. i. 344; Brot. ii. 176; EB. t. 956; DC. i. 355; Buch 196. no. 352; Sm. E. Fl. ii. 286; Presl 145; WB. i. 135; Koch 102; Bab. 44.—Herb. ann. Mad. reg. 1, 2, c; PS. reg. 2, rrr. Dry sunny barren places in Madeira general, particularly beyond Camera de Lobos ascending Cabo Giraõ. At all seasons.—St. 6–12 in. high erect and solitary or several from the same root ascending geniculate. L. remote few finely serrulate. Fl. small pink or rose-colour scentless not more than 1 or 2 opening together in long succession from the hard compact ovate head which is coated with about 6 outer dry brown chaffy shining smooth scales.

2. SILENE L.

* Fl. in secund or distichous racemes or spikes. (*Stachymorpha* Otth. in DC., *Viscago* Koch.)

1. S. GALLICA (L.) Webb and Berth.

More or less hirsute; l. lanceolate or oblong, the lower

spathulate or obovate obtuse; st. single erect or branched and straggling, branches spreading divaricate; rac. terminal single or in pairs viscid-hairy; fl. secund alternate; cal. villous tubular, in fr. ovate ventricose, the teeth narrow-acuminate or subulate; pet. obovate mostly undivided and irregularly crenulate, rarely subbifid or entire; carpophore rather short; lower pedic. in fr. often spreading or reflexed.—WB. i. 138; Koch 109. *S. anglica* Bab. 45.—Herb. ann. Mad., PS., reg. 1, 2, 3, ccc; N, M, and S. D. c. Cornfields and waste ground everywhere, a universal weed. March–June, but at almost all seasons.—St. 4–12 in. high often simple erect. Rac. 2–4 in. long. Fl. rather pretty varying from deep pink or rose to white, their throat crowned with erect bifid scales. Var.:

α. vulgaris; rac. mostly many-flowered, fl. imbricate or crowded, pet. undivided finely crenulate immaculate, fr. mostly erect.—*S. gallica* (L.) DC. i. 371; Buch 196. no. 354. *S. cerastoides* DC. i. 372; Presl 149 (not Linn. ex Koch l. c.). *S. lusitanica* (L.) Desf. i. 347; Brot. ii. 184.—In sunny places everywhere.

β. quinquevulnera; pet. with a deep crimson or blood-red spot, mostly undivided but sometimes obcordate or subbifid; pedic. in fr. all erect.—*S. gallica* β. Koch l. c. *S. anglica* β. Bab. l. c. *S. quinquevulnera* (L.) EB. t. 86; Desf. i. 348; Sm. E. Fl. ii. 292; DC. i. 372.—In drier, poorer or scantier soil, as on walls, &c. More hirsute in Madeira than α, with shorter often simple st. and equally dense many-flowered rac.

γ. anglica; less hirsute; st. spreading branched diffuse, fl. axillary or remote in leafy elongated rac., pet. often slightly cloven or obcordate, pedic. of lower fl. spreading or reflexed.—*S. gallica* γ. Koch l. c. *S. anglica* α. Bab. l. c. *S. anglica* (L.) EB. t. 1178; Sm. E. Fl. ii. 291; DC. i. 371.—In moister richer soil or shady places, occasionally.

S. lusitanica L. (Desf., Brot.) and *S. gallica* β. Koch differ respectively from α and β in having the fr. spreading or reflexed; whilst *S. quinquevulnera* EB. t. 86 (*S. anglica* β. Bab.) differs from β in its diffusely branched st. and lax leafy few-flowered rac. much as γ (*S. anglica* L.) differs from α (*S. gallica* L.). But it would be endless to define the multifarious forms of this very variable pl. dependent upon soil and situation. I have therefore abstained from making the Mad. pl. α and β distinct varr.

2. S. NOCTURNA L.

Shortly and closely furry-pubescent; st. and branches quite erect rather tall; l. lanceolate, the upper linear, the lower spathulate and fringed or ciliate with long hairs at the base;

rac. terminal single elongate, fl. secund alternate adpressed, cal. tubular cylindric-oblong 10-striate pubescent, the teeth short ovate, pet. small inconspicuous narrow bifid involute; caps. cylindric-elongate contracted at top; carpophore short thick.—Brot. ii. 183; DC. i. 372; WB. i. 138. *S. nocturna* and *S. mutabilis* (L.) Spr. ii. 409. *S. vespertina* Bourg.! Pl. Can. exsicc. in BH. no. 333, "Lancerottæ in cultis" (not Retz nor WB. i. 139).—Herb. ann. Mad. reg. 1, rr; PS. reg. 2, c. Cornfields near the Gorgulho and Ponta S. Lourenço; in Porto Santo general. April, May.—St. 1–2 ft. high very erect straight and stiff. Herbage dull gr. not glaucous or viscid. Pet. scarcely longer than the cal., dull smoky-greenish outside, white inside, tightly rolled up inwards in the daytime. Fl. inodorous at least by day, the throat crowned. Var.:

α. fl. crowded and more numerous. *S. nocturna* L.

β. pauciflora Otth. in DC. l. c.; fl. remote and fewer, "pet. smaller."—*S. mutabilis* L. ex DC. *Cucubalus reflexus* L. ex BH. —This is the common and apparently normal condition of the pl. in Porto Santo. But the two forms are scarcely worth distinguishing, and are often indeed united on the same pl.

** Fl. in loose forked corymbose cymes. (*Atocion* Koch; *Behenantha, Conoimorpha, Rupifraga* &c. Otth. in DC.)

3. S. INFLATA Sm. *Orelha Boi.*

Glaucous and usually quite smooth; st. decumbent at the base; l. oblong-lanceolate or elliptic acuminate; cyme terminal dichotomous subcorymbose, fl. drooping; cal. ovate or oblong inflated bladdery smooth many-nerved reticulate, with short broad ovate or triangular acute teeth; pet. deeply cloven, either naked and simply bituberculate at the base of the limb, or crowned; caps. short obovate; carpophore rather long or distinct.—DC. i. 368; Hook. Fl. Scot. i. 134.—Herb. per. Mad. PS. and Dez. nearly throughout the year. Var.:

α. vulgaris; quite smooth and glaucous; fl. st. tall erect, panicle large lax compound many-flowered, pet. w. or flesh-col. not crowned but bituberculate.—*S. inflata α* and *γ* Otth. in DC.; *α*, Hook. l. c.; Sm. E. Fl. ii. 292; Presl 148; WB. i. 136; Koch 112; Bab. 46. *Cucubalus Behen* (*α*, L.) EB. t. 164; Desf. i. 347; Brot. ii. 180; Buch 196. no. 353.—Mad. and PS. reg. 1, 2, c; GD. r. Borders of cornfields, &c. general. Feb.–June. —St. decumbent and leafy at the base, erect and 1–3 ft. high when flowering. Fl. generally w. sometimes pale dull pink or flesh-col.

β. intricata; smooth light gr. scarcely glaucous; root-stock often woody and st. suffrutescent or slightly woody at the base,

much branched and cespitose prostrate, often elongated pendulous; l. smaller fringed with minute cartilaginous points or teeth; cymes small 1–3-few-flowered, cal. smaller less inflated oblong, pet. w. not crowned but bituberculate.—Novit. 28 or 550.—Mad. reg. 3, c. Rib. de Sta Luzia and other ravines, generally hanging in long dense entangled flowery masses down perpendicular rocks. June–Aug.

γ. *maritima*; altogether (except the fl.) smaller than *a*, very smooth glaucous; st. prostrate ascending often cespitose; l. smaller fringed or serrulate with minute cartilaginous teeth; cymes small 1–3-flowered, rarely more compound; fl. larger than in *a*, cal. generally less inflated or more oblong with a violet or purple tint, pet. w., generally but not always crowned with conspicuous bifid scales.—*S. inflata* β. Hook. l. c. *S. maritima* (With.) Sm. E. Fl. ii. 293; EB. t. 957; Bab. 46. *S. uniflora* Roth ex Sm., Koch, &c., ll. cc.—Mad. reg. 1, cc; PS. reg. 1, 2, 4, r/2; ND. ccc; GD. cc; SD. ccc. Sea-coast and cliffs, Machico, Ponta S. Lourenço, Paul do Mar, &c.; Porto Santo, hills on the coast to the eastward, Ponta de Guilherme on the N. coast, Zimbral d'Aréa, and top of Pico de Conselho.—Passes by a thousand intermediate gradations into *a*.

4. S. IGNOBILIS Lowe.

Nearly or quite smooth not viscous more or less glaucous; st. erect dichotomously branched; l. oblong-lanceolate, the lower spathulate, the margin cartilaginous often denticulate with minute points or teeth; fl. remote single solitary stalked erect; cal. at first oblong or subclavate, then ovate or elliptic membranous not inflated 10-striated reticulate upwards, the teeth rounded-ovate and obtuse; pet. inconspicuous small deeply cloven, their lobes equal ligulate or oblong rounded or obtuse crowned with 2 erect truncate scales at the base, scarcely longer than the cal.-teeth; fr. ovate ventricose urceolate or barrel-shaped, carpophore very short.—Novit. 27 or 549. *S. Pseudobehen* Boiss. Diagn. Pl. Orient. 36, 37; Walp. Rep. ii. 778.—Herb. ann. Mad. reg. 1, rr; PS. reg. 2, r. Cornfields, Ponta S. Lourenço; and in PS., between the town and Fonte d'Aréa. March–May.—St. 9–12 in. high branched leafy. L. rather large and broad sometimes subciliate towards the base. Fl. single in the forks of the stem and axils, stalked erect inodorous. Pet. dull lilac-pink or flesh-colour deeply and equally 2-lobed, the cor. thus appearing 10-petalous; sometimes abortive. Fr. rather large erect. Caps. finely and obsoletely granulated. Seeds rather large subechinulate most elegantly ribbed and cancellated.

The "more or less velvety-pubescent" variety (Novit. 549) is a mistake, caused by some intermixture or confusion with

this pl. of young or imperfect specimens of *S. nocturna* L. observed or collected by the late Dr. Charles Lemann. Except occasionally a few long hairs or cilia sprinkled on the edges of the l., *S. ignobilis* is always, so far as I have seen, quite smooth.

5. S. INAPERTA (L.) Ait.

Erect dichotomously branched minutely and closely puberulous or furry-pubescent; branches divaricate stiff and rigid slender or filiform corymbose; l. inconspicuous small lanceolate acute, the lower subobtuse, the upper remote linear acuminate; fl. inconspicuous loosely corymbose erect, their stalks filiform often elongated nearly or quite smooth; cal. slender narrow linear-clavate; pet. linear slightly cloven or obcordate not longer than the cal. teeth; caps. oblong or elliptic, carpophore not quite half its length.—Brot. ii. 188; Bûch 196. no. 355; DC. i. 376; WB. i. 140. *S. filiformis* Novit. 27 or 549, not of Otth. in DC.—Herb. ann. Mad. reg. 2; r. Rocky barren waste ground amongst cornfields and dry beds of ravines; ascent of the Rancho and Cabo Giraõ beyond Camera de Lobos; bed of Rib. de Santa Luzia, &c. Sum., Aut.—Root fibrous decidedly annual. Whole pl. with a peculiar light slender appearance, finely hoary-pubescent below, smooth or nearly so upwards, 1–2 ft. high, with a thin very straight erect virgate st. and forked filiform branches forming a spreading loose corymbose cyme, with the internodes often viscid. L. few remote small and inconspicuous soon falling. Cor. small abortive inconspicuous, not exserted; pet. dull greenish-brown. Caps. oblong or cylindric.

Viscago lævis, &c. Dillen. Hort. Eltham. 424. t. 315. f. 407, seems to be distinct by its "creeping filiform perennial root, ascending leafy few-flowered st., pet. cloven to the base, ovate caps.," &c. The Madeiran pl. is however *S. inaperta* of most authors, and certainly of the Hort. Kewensis and Banks. Herb.

3. AGROSTEMMA L.

††1. A. GITHAGO L. **Corn Cockle.**

Pet. obcordate or retuse, half the length of the long linear acuminate sepals.—Brot. ii. 220; Sm. E. Fl. ii. 325; EB. t. 741; Koch 117. *Lychnis Githago* (Lam.) *a*, DC. i. 387; Bab. 48. *Githago segetum* Desf. i. 363; WB. i. 144.—Mad. reg. 2; rrr. Once brought "from Rib. Frio" in October by a countryman; but a mere accidental straggler and scarcely entitled to admission, though so likely to occur with other corn flowers.—Pl. 2–3 ft. high dichotomously branched hairy; l. linear-lanceolate. Fl. conspicuous handsome solitary stalked. Cal. hard ribbed angular, its teeth narrow slender elongate erecto-patent.

Pet. large not crowned deep crimson or purple with bluish-black longitudinal lines or streaks. Carpophore none.

Suborder II. ALSINEÆ.

4. Sagina L.

* Sep. 4 spreading in fr. Pet. 4 or 0. Stam. 4. Styles 4. Caps. 4-valved. (*Saginella* Koch.)

1. S. procumbens L.

Smooth cespitose or moss-like; main-st. very short, barren branches or stolons elongate slender filiform procumbent or prostrate often rooting at the joints their ends ascending; l. numerous crowded often fasciculate linear somewhat abruptly mucronate quite smooth; sep. obtuse much longer than the pet. rather shorter than the caps.; fr. at first drooping then erect.—Brot. i. 213; Sm. E. Fl. i. 238; EB. t. 880; Buch 196. no. 347; DC. i. 389; H. Fl. Sc. i. 59; Presl 158; WB. i. 147; Koch 118; Bab. 49.

β. spinosa (Gibs.) Bab. l. c.; l. very minutely ciliated-serrulate or spinulose at the edges; sep. distinctly shorter than the caps. —An *S. bryoides* Fröl. in Koch l. c.?—Herb. per. Mad. reg. 2, 3, ccc; GD. reg. 2, rr. Moist places on walls, banks, rocks &c., and in the turf on mountains, everywhere. At all seasons.—A small moss-like dark green pl. like a *Polytrichum* or *Dicranum*, forming tufts or patches 1 or 2 in. high; l. scarcely half an inch long and half a line wide, flat above, convex beneath, more or less fasciculate especially on the barren shoots, often forming terminal rose-like tufts. Pet. irregular small much shorter than the sep. white, sometimes 0. Sep. spreading crosswise below the ripe caps.

2. S. apetala L.

Barren shoots or stolons none, st. much and regularly branched dichotomously from the base, branches more or less erect slender filiform stiff and straight regularly forked; l. few remote very small and inconspicuous in pairs and not fasciculate linear very narrow gradually or acuminato-mucronate; sep. obtuse much longer than the pet. and shorter than the caps.; fr. always erect.—Sm. E. Fl. i. 240; EB. 881; DC. i. 389; H. Fl. Sc. i. 60; WB. i. 146, 7; Koch 118; Bab. 49.—Var.:

α. glandulosa; glandular-pubescent; l. ciliate at the base.

β. glabra, Bab. ed. 1. p. 45; nearly or quite smooth; l. not ciliate.

Herb. ann. Mad. reg. 1, 2, r; PS. 3 or 4, r. Dry sunny spots. *α*, in garden walks at the Valle near Funchal, and on the walls

of the old Fort at the top of P. de Castello in Porto Santo; *α* and *β* intermixed on the terrace in front of the church-door of N. S. de Livramento in the Curral das Freiras, Mad. March–July. —A small inconspicuous pl. only 2 or 3 in. high, pale dull gr. and very distinct in its more delicate light bushy sparingly leafy habit, like *Radiola millegrana* L., and regularly forked branches, from *S. procumbens* L. Sep. obtuse, the 2 outer submucronulate. L. not uniformly ciliate; in *β* not at all so. Pet. w. very minute, sometimes none. Sep. spreading crosswise below the ripe caps.

5. Spergula L.

1. S. arvensis L.

L. somewhat fleshy linear-filiform convex above channelled or grooved beneath blunt at the tip; fl. in forked glandular-pubescent cymes; sep. ovate and with the deflexed fruit-stalks glandular-pubescent; pet. slightly longer than the sep.; seeds dull coal-black spheroidal-lenticular or strongly doubly-convex and subglobose, simply carinate with a narrow raised keel or margin, not winged, finely and obsoletely granulated or papillose.—Desf. i. 368; Brot. ii. 214; EB. t. 1535; DC. i. 394; Presl 159; WB.! i. 146†; Koch 120; Bab. (ed. 1) 46, (ed. 4) 124. *S. arvensis α*, Sm. E. Fl. ii. 336.

β. vulgaris Koch, Bab. ll. cc.; seeds frosted with white or pale brown clavate warts or papillæ.—Herb. ann. Mad. reg. 1, 2; ☉. Cornfields at Camaxa, S. Vicente, and between Feijaã d'Ovelha and P^ta^ de Pargo; bed of the Rib. de Maxico, &c. Oct.–June. —St. loosely spreading 6–12 in. long; l. imperfectly whorled or fascicled at the joints, linear-subulate rather obtuse fleshy flaccid 1–1½ in. long. Branches of cyme pedic. and sep. always more or less glandular-pubescent. Pet. white a little longer than the sep. Stam. 4–10, often 5. Styles always 5. Caps. always distinctly 5-valved. Seeds dull coal-black not shining, frosted with pale yellowish deciduous bristly warts like grains of sand, lenticular-globose or tumid-lenticular subangular, with an equatorial distinct keel, which is sometimes broader and thinner than usual and with a pale edge, but never at all winged.

6. Spergularia Pers.

1. S. fallax Lowe.

Altogether smooth; l. somewhat fleshy linear-filiform flattish and slightly grooved towards the base above, convex or flattened beneath, blunt at the tip; sep. lanceolate and with the deflexed fruitstalks wholly smooth; pet. lanceolate as long as

† Bourgeau's no. 334 in HH. is the present pl. His no. 334 in BH. is *Spergularia fallax*. (See Hook. Journ. Bot. viii. 290.)

the sep.; seeds shining coal-black flattened lenticular finely and sharply granulate bordered with a broad membranous radiato-plicate wing or frill.—Hook. Journ. Bot. viii. 289, 290; ix. 75. *Spergula pentandra* WB.! i. 145 (not Linn.!); Bourg.! Pl. Canar. no. 410 in BH., partly; Hook. fil. and Thoms.! Herb. Ind. Or. in HH.; Griff.! Affghan. Exs. no. 1629 in HH. *Spergularia?* (595) Stocks! Scinde, in HH. *Spergula pentandra* var. *intermedia* Boiss.! Pl. Or. nov. Ser. 2. 93, 94. *Spergula arvensis* Bourg.! Pl. Canar. exs. no. 334 in BH. (not Linn.). *Arenaria flaccida* Roxb. Fl. Ind. ii. 447.—Herb. ann. Mad. PS. and ND. reg. 1, SD. reg. 1, 2; r. or $\frac{r}{2}$, locally c. Sea-cliffs a little to the E. of Funchal and cornfields about the Brazen Head; roadsides and borders of cornfields towards Pico d'Anna Ferreira in PS.; at the top of N. and SD. March–July.—Habit and stature of *Spergula arvensis* L. but a more delicate pl. in all its parts, and always altogether smooth. L. slightly flattened above and beneath, obsoletely channelled above. Fl. similar but smaller, with the sep. more lanceolate than ovate and narrower, of a fresher more vivid green contrasting more with the narrow white membranous edges. Pet. lanceolate clawed not longer than the cal. white. Stam. 6 or 7. Styles and valves of the caps. always 3. Seeds intense coal-black shining as if polished. —At once distinguishable from *Spergula arvensis* L. by the constantly 3-valved instead of 5-valved caps., the perfectly smooth pedicels and sep., and broadly winged seeds.

The true *Spergula pentandra* L. by the original types from Löfling in the Linn. Herb. has also smooth-stalked cymes and sep., but is a much smaller pl. with larger fl. especially in bud, broader ovate sep. broadly edged with violet-purple, and pet. a little longer than the sep. The caps. are immature; but in the largest of the specimens on a separate sheet, 5 or 6 in. high, the caps. is truly 5-valvular, being partially split into 4 distinct valves, one of which is twice the breadth of the others and has manifest traces of a 5th medial suture. The smaller specimens on the other sheet, $\frac{3}{4}$–$1\frac{1}{2}$ in. high, are marked "Hab. Madriti in collibus vulg."; and though ambiguous as to their capsular valvation, agree precisely otherwise with 6 specimens in BH. of "*S. pentandra* L." marked "1. Hispania C. G. Ortega M.D. 1777," and with another marked "H. L. Hab. prope Madritum, Löfling," which have a distinctly 5-valved caps. Thus *Spergularia fallax* seems to be no less distinct from the true Linnæan Spanish pl. (*S. pentandra* L.) of Löfling and Ortega, with which it agrees in its entire freedom from glandular pubescence, than from *Spergula arvensis* L.

2. S. RUBRA (L.) Pers.

Glandular-pubescent at least upwards; st. round; l. somewhat fleshy linear-subulate flattened above and beneath mucronate; fl. somewhat racemose and secund; fruitstalks deflexed viscid pubescent; sep. lanceolate obtuse nerveless with broadly scarious margins viscid-pubescent; caps. not longer than the sep. rather shorter than the slightly declining fr.-stalks; seeds pale brown compressed subtriangular pear-shaped or obovate, finely granulate or echinulate at the back, wingless.—Presl 160. *Arenaria rubra* (L.) EB. t. 852; Desf. i. 357; Brot. ii. 201; Sm. E. Fl. ii. 311; Hook. Fl. Sc. i. 138; Spr. ii. 400. *A. rubra* L. *a*, DC. 1. 401. *Lepigonum rubrum* Koch 121; Bab. ed. 4. 124 (var. *a*). *Alsine rubra* (Wahlenb.) WB. i. 148; Bab. ed. 1. 50.—Herb. ann. Mad. reg. 1, c/2; reg. 2, rrr; PS. reg. 1, cc; GD. reg. 2, r/2. Gorgulho rocks; Praza in front of the Governor's palace in Funchal; at Machico, Porto da Cruz, and Porto Moniz, near the sea: Curral das Freiras in front of the church-door. March–July.—St. prostrate in a circle numerous subcespitose jointed dichotomous leafy 4–12 in. long the ends ascending. L. fascicled acute almost always except in PS. specimens bristle-pointed, in pl. growing near the sea almost or quite smooth. Fl. pale dull pink or rose-purple small and pretty racemose and secund on the terminal branches of the cymes. Pet. purple of varying intensity deeper towards the tip not longer than the sep. Styles 3. Caps. always 3-valved not longer than the calyx. Seeds very minute pale reddish-brown minutely scabrous most distinctly at the back or rounded thickened outer edge, not shining or polished and never winged.

7. ARENARIA L.

1. A. SERPYLLIFOLIA L.

Finely and closely pubescent; st. erect or ascending dichotomously branched; l. ovate acute or acuminate subscabrous sessile, the lower contracted at the base into a short stalk; fl. in forked cymes; sep. lanceolate acuminate 3-nerved or ribbed longer than the pet.—Desf. i. 356; Brot. ii. 200; EB. t. 923; Sm. E. Fl. ii. 307; DC. i. 411; Presl 164; Koch 128; Bab. 52.

β. glutinosa Koch l. c.; smaller viscous clothed upwards with glandular hairs besides the short close pubescence. *A. serpyllifolia* WB.! i. 150. *A. serpyllifolia β, viscida* DC. l. c.?; *γ, depauperata* Novit. 27 or 549.—Herb. ann. Mad., PS., reg. 4, rrr; SD. reg. 2, cc. Summit of Pico Grande Mad. and P. de Castello PS. in the turf. April–Aug.—A small insignificant pl. 2 or 3 in. high with erect or spreading forked stiff slender branches. Fl. numerous from the forks of the st. or axils of upper l. Pet. w. small inconspicuous, narrow-ovate. Caps.

6-valved ovate-elongate or conic-acuminate shorter than the sep. Seeds minute tumid-reniform dark brown granulated.

8. Stellaria L.

1. S. media (L.) With. **Common Chickweed.**

St. prostrate ascending flaccid cespitose dichotomous hairy on alternate sides between the joints; l. ovate acute or shortly acuminate stalked, the uppermost sessile; fl. axillary and terminal single on long stalks which are hairy on one side; pet. deeply cloven not longer than the lanceolate 1-nerved glandular-hairy sep.; fruitstalks deflexed; caps. oblong rounded at the base a little longer than the sep., 6-partite or with the valves cloven below the middle.—EB. t. 537; Sm. E. Fl. ii. 301; DC. i. 396; Presl 160; WB. i. 152; Koch 129; Bab. 53. *Alsine media* (L.) Desf. i. 271; Brot. i. 476.—Herb. ann. Mad. reg. 1, 2, 3, ccc; PS. reg. 2, 3, c. One of the commonest weeds in Mad., about Funchal, and in cultivated ground, everywhere; less common in PS., and not observed in the Dezertas. Nov.–June chiefly.—Herbage very variable in size and luxuriance light or y. gr. tender succulent or juicy. St. very numerous matted leafy often elongate 6–12 in. long. Petioles broad ciliate. L. smooth. Fl. small white. Stam. 3–10 generally 5; in richer or moister soil 10, the whole pl. being larger and more robust with the sep. smooth, constituting var. *β major* Koch, or *γ umbrosa* (Opitz) Bab. l. c.

2. S. uliginosa Murr.

St. diffuse 4-angular smooth, l. sessile ovate or oblong-lanceolate with a callous tip smooth ciliated at the base; cymes dichotomous small few-flowered lateral and terminal, br. scarious smooth at the edges; pet. bipartite shorter than the lanceolate 3-nerved sep.; caps. ovate attenuated at the base about equal to the sep.—Brot. ii. 196; EB. t. 1074; Sm. E. Fl. ii. 303; Koch 131; Bab. 54. *S. aquatica* DC. i. 398. *Larbrea aquatica* (St. Hil.) DC. iii. 366, (not of Ser. in DC. i. 395). *Arenaria alsinoides* Raddi, Breve Osserv. sull' Isola Madera (Firenze 1821) p. 13 (with apetalous fl.). *A. Raddiana* (Ser.) DC. i. 412.—Herb. ann. Mad. reg. 2, 3; ccc. Wet sandy or muddy places chiefly in beds of ravines everywhere above 1500 ft. May–July chiefly.—Whole pl. nearly or quite smooth pale gr. often slightly glaucous. St. numerous branched and matted jointed trailing often rooting at the lower joints, 6–18 in. long. Ped. axillary mostly 1–3-flowered. Fl. small inconspicuous, often apetalous. Sep. very narrow acuminate spreading like a star in fl., afterwards erect. Pet. caducous very small white not half the length of the sep.—A bad but undoubted Mad. specimen of this pl. in the BH., marked "*S. graminea* L. ?"

has doubtless occasioned the insertion of *S. graminea* as well as of *S. uliginosa* in Von Buch's list of Mad. pl. The true *S. graminea* L. is certainly not found in the Madeiran islands.

I am much indebted to M. Alph. DeCandolle for an extract from the rare little work of Raddi above quoted, which by its accuracy of application to the Madeiran apetalous state of *S. uliginosa* Murr. enables me to quote *Arenaria alsinoides* Raddi, and hence *A. Raddiana* Ser., with little short of the certainty accruing from actual comparison of types.

9. CERASTIUM L.

* Root scarcely more than annual or biennial. Pet. not longer than the calyx.

† Caps. curved. Pet. about as long as the sepals.

1. C. GLOMERATUM Thuill.

Hairy-pubescent *light gr. viscid*; *st. stiffly erect and straight or ascending*, several and tufted, or single; *l. short broadly ovate or oval and rounded*; *fl.* of cyme aggregate *in close compact or crowded heads or fascicles*; *br. all herbaceous* and like the narrowly scarious-edged *sep. hairy quite to the points* which are mostly *bearded or tipped with a distinct pencil of several long hairs*; *fruitstalks* and pet. *shorter or not longer than the cal.*—WB. i. 151; Koch 132 (var. *a*); Bab. 54. *C. viscosum* Linn. Syst. Nat. ed. 12. 320, and Sp. Pl.; Desf. i. 366; also Fries, Gaudin (ex Koch). *C. vulgatum* Linn. Herb.! EB. t. 789; Sm. E. Fl. ii. 330; Hook. Fl. Sc. i. 142; DC. i. 415 (var. *a* and *β*). *C. vulgatum β* (*C. viscosum*) Brot. ii. 218.—Herb. ann. Mad. reg. 1, 2, 3, c; PS. reg. 4, r; SD. reg. 2, r. Rocky banks and hill-sides, beds of ravines, &c., above the Mount, in Rib. Frio, near the sea at Campanario, Machico, S. Vicente, &c., Mad.; summit of Pico de Facho and P. de Castello, PS., and of SD. Febr.-Oct.—St. 4–12 in. high very erect and simple. L. shortly ovate often rounded and obtuse. Pet. small and inconspicuous. Caps. cylindric ascending twice as long as the cal.—Distinguished at once from the more common *C. triviale* Link by its pale herbage turning y. after flowering, its short broad leaves, and smaller fl. collected into heads or bundles.

2. C. TRIVIALE Link.

Hairy-pubescent *dark gr.* scarcely viscid; *st. spreading diffuse and straggling* sometimes rooting, the ends ascending; *l. oblong-lanceolate*; *fl.* of cyme *lax or distinct*, only the uppermost aggregate; *br. and sep.* with a broadly scarious margin, *smooth at the tips*; pet. as long as, *fruitstalks at least as long as, and*

mostly distinctly longer than the cal.—Koch 133 (var. *a* and *β*); Bab. 55 (var. *a*). *C. vulgatum* Linn. Syst. Nat. ed. 12. 320, and Sp. Pl.; Desf. i. 365; also Wahlenb., Fr. (ex Koch). *C. vulgatum a.* Brot. i. 218. *C. viscosum* Linn. Herb.! EB. t. 790; Sm. E. Fl. ii. 330, 331; Hook. Fl. Sc. i. 142, 143; DC. i. 416.—Herb. bien. or subper. Mad. reg. 2, 3, ccc. Mountain pastures, ravines, &c., everywhere above 1000 ft. May–Oct. chiefly.—St. 6–18 in. long widely branched and straggling, only erect or ascending when supported. L. ovate-oblong pointed. Hairs of pedic. and sep. more or less intermixed with viscid glands. Pet. as long as or rather longer than the sep. Caps. cylindric ascending twice as long and fruitstalks often more than twice as long as cal.—An altogether coarser and larger pl. in all its parts than *C. glomeratum,* with longer rampant st., narrower l. longer in proportion to their width, larger more branched and spreading cymes, longer pedicels, more scarious br. and sep. not tipped with hairs, and larger more conspicuous fl.

†† Caps. nearly straight. Pet. shorter than the sep.

3. C. TETRANDRUM Curt.

Hairy-pubescent, glandular and viscid upwards; *st. forked from the base with a fl. in each fork leafy,* branches erect short numerous often densely tufted and pulvinate, sometimes decumbent at the base; l. oblong or oval mostly recurved, the upper ovate or lanceolate sessile, the lower oblong attenuated into long petioles, all acute; br. wholly herbaceous broad and leafy altogether without scarious tips or margins oval or ovate acute or apiculate; sep. lanceolate acute herbaceous with their tip and margins narrowly scarious; fl. or rather fr. large, the former erect mostly tetramerous in forked leafy subcorymbose cymes, not aggregate or fascicled; pet. bifid and much shorter than the sep.; *fruitstalks straight* mostly erect 2–3 *times as long as the sep.*; caps. as long as or rather longer than the sep. with mostly 8 very short and obtuse or truncate shallow teeth.—Sm. E. Fl. ii. 332; Koch 133; Bab. (ed. 4) 55. *C. atrovirens* and *C. tetrandrum* Bab. (ed. 1) 52, 53. *Sagina cerastoides* EB. t. 166 (a drawn-up luxuriant garden state of the pl.).—Herb. ann. Mad. reg. 4, and upper part of 3; r. Highest summit of Pico Grande, top of the Paul; "peaks above the Icehouse," Dr. C. Lemann. July, Aug.—Habit and pale colour of *C. glomeratum* Thuill. but of much smaller humbler growth and size, being not more than 2 or 3 in. high. Fruitstalks in both native and cultivated Madeiran plants almost always erect, rarely patent or a little deflexed or declining, but never so far as I have seen reflexed, and usually not more than twice the length of the sep., often in the upper fl. less. A few fl. (the primary or lower

in the forks) are pentamerous and larger, with more bulky 10-valved caps.; but the great majority are tetramerous though still often with 5 stam. Pet. small inconspicuous about $\frac{2}{3}$ the length of the sep. heart-shaped with blunt lobes cloven nearly halfway down. Seeds bright reddish-chestnut, compressed, granulate most strongly at the back.

** Root perennial. Pet. twice as long as the calyx.

4. C. VAGANS Lowe.

More or less pubescent, always glandular and viscid upwards; st. elongate diffuse and weakly straggling, suffrutescent downwards, ascending upwards, and with the whole cyme, br. pedic. and sep., densely clothed with tawny glandular viscid hairs; l. narrow linear-lanceolate acuminate or ensiform and sessile crowded downwards; fl. numerous; br. ovate or lanceolate herbaceous; sep. generally bluntish with broad scarious tips and margin, pet. bifid conspicuous scarcely twice as long as the sep.; caps. short ovate or oval before bursting, equal to or a little longer than the sep.—Novit. 26, 27, or 548, 549.—Per. Mad. reg. 3; rr. Dry rocks from 4500 to 5500 ft. Along the Caminho Central, between the Primeira Vista and the first view into the Serra d'Agoa; also under Pico Grande. July, Aug.—Habit and foliage of a *Stellaria*. St. 6 to 18 in. or 2 ft. long, slender, and with long internodes upwards, but decidedly shrubby below and thickly jointed, the joints swollen, with short internodes, never rooting, and although branched, and often crowded, not at all cespitose. L. more or less pubescent but never ciliate, stiffish and sharp-pointed, very like those of *Stellaria Holostea* L. but shorter, scarcely an inch long and 2 or 3 lines wide, usually tapering gradually from the base to the point, sometimes more or less lanceolate. Cymes erect forked subcorymbose 7–14- or more flowered. Even the minute uppermost bracts are very slightly if at all scarious at the tips or margins; but the sep. are broadly so. Pedic. before and after flowering always perfectly erect, not bent beneath the cal., but with buds, fl. and fr. alike erect. Styles 5. Caps. usually concealed by the cal., with 10 short blunt valves. Var.:

α. fulva; altogether densely clothed with tawny glandular hairs.

β. calva; altogether smoother, the lower l. nearly or quite smooth.

Approaches nearest to *C. arvense* L. *γ. suffruticosum* Koch 136; but is sufficiently distinct from every state of the sp. by its altogether larger size and diffuse or rampant not at all cespitose habit, its long straggling divaricate branches with long internodes and fulvous pubescence, its longer not ciliate leaves

and larger more ovate or oval capsules. A further argument in proof of the two pl. being really distinct sp. is the occurrence of the true *C. arvense* L. (WB.! i. 152; Bourg.! Pl. Can. exs. no. 719) in the Canaries, retaining all the char. and habit of the common English or European form.

Order XII. MALVACEÆ.

The Mallow Family.

Fl. perfect. Cal. 5- (rarely 3–4-) cleft valvate in the bud, often double with an outer involucre or bracteolæ. Cor. regular. Pet. as many as the inner sep. twisted in the bud, often connate with the stamen-tube. Stam. mostly numerous monadelphous united into a tube; anth. 1-celled reniform bursting transversely. Ovary composed of several or many carpels arranged round a common axis. Fruit capsular rarely baccate. Carpels verticillate 1–many-seeded. Embryo curved with twisted or doubled cotyledons and little or no albumen.—Leaves alternate stipulate. Pubescence generally stellate.

* Cal. double or involucrate.

1. LAVATERA. Inner cal. 5-cleft, outer of 3 leaves or bracts partly connate or united at the base. Caps. orbicular many-celled, cells 1-valved 1-locular 1-seeded unarmed simple.
2. MALVA. Inner cal. 5-cleft, outer of 2–6 (mostly 3) quite distinct not united narrow oblong or setaceous bracts. The rest as in *Lavatera.*
3. MODIOLA. Inner cal. 5-cleft, outer of 3 distinct narrow or setaceous bracts. Caps. orbicular many-celled, cells 2-valved 2-locular 2-seeded armed bicuspidate or biaristate. (*Modiola* Lam., applied in zoology to a well-known Mytilaceous genus of Lamellibranchiate Mollusks, must yield to the long prior claim of the present well-marked botanical genus of Mœnch. For the Molluscan genus *Modiola* Lam., it would be best perhaps to modify the Lamarckian name into *Modiolus* or *Modiolaria.*)

** Cal. single, without bracts or involucre.

4. SIDA. Cal. 5-cleft 5-angular. Caps. orbicular many-celled, cells 1-valved 1-locular 1-seeded often armed beaked or aristate.
5. ABUTILON. Cal. 5-cleft 5-angular. Caps. orbicular or globose many-celled, cells inflated bladdery 1-valved 1-locular many-seeded unarmed.

1. Lavatera L.

1. L. sylvestris Brot. *Malva.*

Greyish and clothed all over with starry pubescence; st. herbaceous diffusely spreading more or less erect; l. roundish-heartshaped with mostly 5 crenate lobes shallow and rounded in the lower, deeper and pointed in the upper l.; fl. axillary stalked aggregate often ternate, pedic. always erect shorter than the petioles; involucral br. or outer sep. broadly ovate united about one-third upwards; pet. narrow notched or bilobed thrice as long as the cal.; fr. quite smooth covered by the inflexed sep., valves rounded plain and even at the back, entire or with only a few faint obscure plaits or obtuse teeth at the edges; central disk small simple.—Brot. ii. 277, 278; Brot. Phyt. Lusit. ii. 225. t. 179. f. 2; DC. i. 440. *Malva Pseudo-Lavatera* WB.! i. 29, 30. Bourg.! Pl. Can. Exsicc. no. 667. in BH. and HH. *L. cretica* Cav. Diss. 2. 89. t. 32. f. 1 (not Linn.!).—Herb. ann. Mad., PS. reg. 1, 2; ccc. Roadsides and waste places everywhere. April–July.—St. 1–2 ft. long mostly branched and spreading, sometimes simple and erect, rarely prostrate. Stip. ovate or ovate-lanceolate. Fl. pale rose-purple middle-sized; claw of pet. slightly fringed or ciliate. Carpels sometimes very faintly reticulate at the back and obsoletely toothed at the edges but mostly quite plain and even and always perfectly smooth as described by Cavanilles, who mistook it for *L. cretica* L. (Jacq. Vindob. i. p. 15. t. 41), which is an altogether larger stouter much more hirsute pl., with larger thickly shaggy fr. and sep., hispid-pubescent or densely strigose carp., and sharply lobed leaves. Jacquin's fig. above quoted well agrees with the original Linnæan type of *L. cretica* L. in Herb. Linn.: but neither one nor the other affords any information as to the carpels, which however by numerous specimens in HH. are closely and thickly hirsute.—*L. sylvestris* in general aspect much resembles the common English *Malva sylvestris* L.; but it is at once distinguished by the 3 bracts being united at the base into the monophyllous outer cal. of a *Lavatera.*

Lavatera arborea L. (the Tree Mallow) occurs in 2 or 3 places (Porto da Cruz in Madeira, and in Porto Santo) about cottages and in gardens near the sea; but it has no claim to a place in the Flora.

2. Malva L.

1. M. parviflora L. *Malva.*

More or less starry-pubescent but often nearly smooth and shining; st. spreading prostrate or ascending rarely upright; l. subreniform or broadly roundish-heartshaped with 5–7 very shallow and obtuse or rounded crenate lobes; stip. ovate;

fl. small and inconspicuous in axillary clusters, 1–3 or 4 together, mostly 2 or 3, and nearly or quite sessile; pet. but little longer than the cal. retuse or widely notched, their claw very faintly and minutely ciliate; invol. br. or sep. 3 very narrow linear shorter than the broadly ovate sep. of the more or less smooth sometimes pubescent inner cal.; pedic. in fr. slightly elongated mostly erect; fr. somewhat pubescent, rarely quite smooth, with the cal. spreading or erect and open; valves strongly and elegantly cancellated or sharply reticulated at the back, with the margins usually sharply raised or prominent and irregularly but distinctly toothed; central disk small.—Linn. Herb.! Cav. Diss. 2. 68. t. 26. f. 1; Desf. ii. 116; DC. i. 433; WB.! i. 29; Presl 177 (except "cor. cærulea").—Herb. ann. Mad. reg. 1, 2, ccc; PS. reg. 1, 2, r/2; ND. r; GD. c/2; SD. r. Roadsides and waste ground. March–July.—St. branched 6–18 in. long. L. dark dull gr. on very long petioles which have frequently a thickly pubescent line on their upper side; upper l. always pubescent and more deeply and sharply lobed. Pet. pale pink or rose-colour, limb retuse with a wide irregular shallow sinus, the lobes unequal; claw very slightly and sparingly fringed or ciliate. Var.:

a. pubescent; st. prostrate; fl. and fr. nearly or quite sessile; pet. scarcely longer than the cal.—In dry poor soil or exposed places everywhere.

β. nearly smooth; st. more erect or ascending; fl. and fr. distinctly stalked, pedic. deflexed or declining; pet. sometimes rather longer than in *a*, yet not exceeding twice the length of the cal.—In richer moister soil or amongst other herbage.—A rather larger stouter and more upright pl. than *a*, with the fruit-stalks often an inch long and mostly 2 or 3 together. I can perceive no sure or constant marks of difference to distinguish from this state of the species *M. borealis* (Wallm.) Bab., Koch (*M. parviflora* Huds., *M. pusilla* Sm. EB. t. 241, *M. rotundifolia* β. DC., Sm. E. Fl., *M. rotundifolia* Fries): and indeed, not only Hudson, but Linnæus himself in his Herb. (see also EB. at t. 241) appears to have referred the plant in question to *M. parviflora* L.: a specimen marked by Linnæus himself "parviflora," with "(Huds. J. E. S.)" added in pencil by Sir J. E. Smith, being pinned in the Linn. Herb. to his original *M. parviflora*, from which it only differs in the carpels being quite smooth (which is however sometimes the case in the Mad. pl.) and in their being perhaps somewhat more finely or neatly cancellated, with their margins not raised or prominent. It is remarkable that Dillenius in Ray's Synopsis, p. 251, no. *3, calls the cor. "cærulea" in the "Hithe" pl. (*M. parviflora* Huds.), as Presl does in his Sicilian *M. parviflora* L.; whereas it is as truly pink or rose-colour in the EB. "Hythe" pl. as in

the Madeiran.—*M. Nicæensis* All. (Cav. Diss. 2. 79. t. 25. f. 1; RFG. 5. t. 168. f. 4838) is another closely allied pl., which may possibly have been overlooked in Madeira. It is mainly distinguished from *M. parviflora* L. by the broader leafy ovate or oblong-lanceolate (ovate-lanceolate Cav.) outer sep. or invol. br.; and the fr., which is either (as in *M. parviflora* L.) smooth, or more or less pubescent (subvillose Cav.), is also more neatly and finely cancellated, with the central disk often larger (as in *M. rotundifolia* L.), and with the edges of the carp. not raised or prominent. None of these char. however can be much depended upon to distinguish it from *M. parviflora* L. unless it be the first, in which it approaches *M. mauritiana* L.; forming as it were an intermediate link between the two; having the shorter pet. and more sharply or distinctly cancellated fr. of the former sp., and the leafy invol. br. and immarginate carpels of the latter.

2. M. MAURITIANA L. *Malva.*

More or less starry-pubescent but mostly somewhat smooth and shining; st. diffusely spreading or procumbent, often prostrate; l. on long smoothish or slightly pubescent footstalks with often a hairy line on the upper side, reniform or broadly roundish heartshaped, with 5 obtuse or rounded toothed or crenate lobes shallow in the lower l., deeper but scarcely ever acute in the upper; stip. ovate; pedic. axillary few *i. e.* 1–3 rarely 5 together erect usually much shorter than the petioles; fl. large conspicuous, pet. fully 4 times longer than the cal. deeply and widely notched or subbilobed, their claw thickly and copiously fringed or bearded on each side; invol. br. or sep. 3 unequal elliptic-ovate or lanceolate shorter than the inner sep. which are inflexed, closing over the fr.; fr. rather large thickly pubescent almost hirsute, the valves obscurely cancellated or reticulato-scrobiculate and beaded or granulated up the sutures at the back, not margined or toothed at the edges; central disk small.—Linn. Syst. (ed. 12) ii. 460; Cav. Diss. ii. 77. t. 25. f. 2; Brot. ii. 274; Brot. Phyt. Lusit. ii. 223. t. 179. f. 1; DC. i. 432; Koch 142 (under *M. sylvestris* L.).—*M. mauritanica* Linn. Herb.! Buch! 196. no. 343. *M. rotundifolia* Buch! 196. no. 342 (not Linn.).—Herb. ann. Mad. reg. 1 and lower edge of 2; ♃. Roadsides, vineyards and waste ground chiefly at 1000 ft. above the sea. About S. Martinho and S. Antonio, Praya Formosa, and between Caniso and Porto Novo. May–July.—St. branched 1–3 ft. long very tough and almost woody at the base. Herbage very variable in degree of pubescence, but appearing mostly smooth and shining to the eye. L. dark dull green, nearly smooth above, more pubescent beneath. Petioles distinctly hairy at their junction with the l., smoother downwards. Pedic. not longer than the pet. nearly or quite smooth. Fl. handsome large and numerous or

produced copiously all over the pl. about an inch in length and more in breadth. Br. quite distinct or separate very variable in shape and breadth, all sometimes ovate or oval sometimes elliptical or lanceolate, often in the same fl. either ovate or narrow-lanceolate. Pet. bright purplish rose or deep full pink, wedgeshaped, their claw with a large tuft or thick fringe of hairs on each side.

Differs from *M. sylvestris* L. in its smaller size, more procumbent or diffuse or even prostrate habit, smooth petioles and pedicels, obtusely and fewer (only 5-) lobed l., larger brighter or richer and deeper coloured fl. which are also rarely more than 3 together, shorter pedic. (scarcely the length of the fl.), longer pet., narrow and more distant outer sep., larger fr. and thickly pubescent immarginate distinctly cancellated carpels. The fl. are of a fuller richer colour; not however brighter though perhaps deeper pink than as represented in *M. sylvestris* L. EB. t. 671, yet not deep red or "sanguineous" as in the original Linnæan spec. or as in the pl. described by Koch, p. 142: of which however the Madeiran pl. can be considered merely a less robust pale-flowered state or var.

In the Banks. Herb. there are only two Madeiran specimens of *Malva*; both collected in Madeira by Banks and Sol., one marked by Solander himself *M. mauritiana* L., the other *M. rotundifolia* L. The first of these is in its present state quite indeterminable, though there is nothing against its being correctly named: the 2nd, after long and careful examination I am quite satisfied is also exactly the same pl., possessing none of the really distinctive characters of *M. rotundifolia* L., though it is undoubtedly the original type of *M. rotundifolia* of Von Buch's list of Madeiran pl. It has indeed the pet. only 3 times the length of the cal. in the only remaining imperfectly expanded fl.; but on the other hand the sep. close in over the fr., as in *M. mauritiana* L., instead of standing erect or lying open as in *M. rotundifolia* L. The 3 involucral bracts are lanceolate and distant from each other. The fr. is densely strigose-pubescent or hirsute instead of softly and shortly velvety, with the surface of the carpels obviously rugose across or irregularly cancellated beneath the close-set short whitish stiff pubescence; but their edges are not toothed or raised. Lastly, the central disk is small, instead of large as in the true *M. rotundifolia* L. (EB. t. 1092): a pl. not existing so far as I have observed in Madeira, though included in Holl's List; which contains however neither *M. parviflora* nor *M. mauritiana* L.

3. Modiola Mœnch.

(*Haynea* Rchb. not Schum. or Willd.)

††1. M. caroliniana L.

Hispid; st. stiff and woody, prostrate, creeping; l. palmate 5–7-lobed, lobes deeply toothed or cut, smooth above; pedic. axillary solitary erect longer than the petiole; pet. entire; fr. and cal. hirsute-strigose.—*Malva caroliniana* Linn. Herb.! Cav. Diss. 2. 58. t. 15. f. 1; DC. i. 435; Spr. iii. 92.—Herb. ann. Mad. reg. 1; r. Waste ground immediately below the terrace-wall of the Quinta do Valle near Funchal; formerly abundant, but the locality by late alterations and enclosures seems now to be destroyed. March, April.—An inconspicuous pl. with st. 1–2 ft. long, creeping amongst grass and rooting for a part of their length, the ends only a little ascending, straight or regularly flexuose, thin and gr. but stiff and woody, the pl. however being not only decidedly annual but of very brief duration. Herbage bright gr. Lower l. less, upper more divided, lowermost undivided crenate. Stip. ovate. Pedic. hispid. Br. or involuc. sep. linear-lanceolate. Sep. rugosely or granulate-strigose, in fr. erect not closed. Fl. small but pretty, $\frac{3}{8}$ in. in diam.; pet. pale dull scarlet with a dark lunate mark at the base, their claw greenish y. Fr. blackish of 20–22 partially 2-celled carpels, the upper cell bursting widely open, the lower indehiscent.

4. Sida L.

††1. S. carpinifolia L. fil.

A low shrub clothed with forked or cruciform adpressed hairs; branches compressed or flattened upwards; l. ovate or ovate-oblong unevenly and coarsely or somewhat doubly serrate; stip. linear acuminate erect; peduncl. axillary 1–4-flowered mostly solitary very short much shorter than the petioles; fr. hirsute at top, of 8–11 carpels each with 2 short horns at the outer upper angle of the back and a single longer recurved awn at the inner angle.—*S. carpinifolia* L. fil. Cav. Diss. 1. 21; 5. 274. t. 134. f. 1; and *S. planicaulis* l. 24. t. 3. f. 11. *S. carpinifolia* and *S. carpinoides* DC. i. 461. *S. carpinifolia* WB. i. 37. *Malva subhastata* Holl's List (not Cavanilles).—Shr. per. Mad. reg. 1; r. Roadsides and waste ground amongst gardens and vineyards abundantly in the western suburbs of Funchal, beginning from the now desecrated and dismantled church and convent of S. Francisco; in the garden of which it was found by Masson in 1776, and sent to Dr. Solander with the remark, "called Tea by the inhabitants, and cultivated in their gardens" (Sol. MSS.): the former part of the observation applying however rather to the following sp. at the present day, and the latter

part to neither. The pl. appears to be confined to the above locality. In fl. throughout the year.—An insignificant little shr. not above 12–18 in. high with few straight straggling tough and stiffish branches sprinkled like the whole pl. with rather long shining whitish or tawny golden very close-pressed starry 4-rayed or forked hairs, one fork or pair of the rays directed upwards, the other downwards, like a St. Andrew's cross or hour-glass. L. bright full gr. broadish 1–1½ or 2 in. long and ¾–1 or ½ in. broad, the lower ovate broader and shorter, the upper oblong-lanceolate narrower and longer. Fl. small bright uniform golden y. the lower mostly solitary but the uppermost often 2–4 together in little heads or short upright rac. The fr. of this Madeiran pl., on which *S. carpinifolia* L. fil. was originally founded, agrees accurately with DeCandolle's description of that of his *S. carpinoides.*

A glance at Cavanilles' figure (t. 21. f. 3) of his *Malva subhastata* sufficiently explains Herr Holl's mistake and verifies his syn. The leaves indeed of *M. subhastata* in the above fig. much resemble in shape those of *S. carpinifolia* L.

Probably introduced into Madeira from Brazil, where it is one of the commonest weeds.

†2. S. RHOMBIFOLIA L. *Cha Ingleza.*

A low shr. free from hairs but clothed with very short and close mealy-looking starry pubescence; l. shortly petioled lanceolate or narrow-oblong serrate, thickly pubescent and pale or glaucous-hoary beneath, smoother above; stip. linear-setaceous erect; pedunc. 1-flowered axillary solitary, aggregate at the ends of the branches, elongated about as long as the leaves and distinctly jointed; fr. smooth, carpels 7–12, 1–2-rostrate. Var.:

α. maderensis; carpels 1-rostrate.—*S. maderensis* Prim. 35, 36. *S. rhombifolia* WB. i. 36. *Malvinda unicornis* &c. Dillen. Hort. Eltham. 216. t. 172. f. 212.—Mad. reg. 1, 2; ccc.

β. canariensis; carpels 2-rostrate.—*S. rhombifolia* (L.) Cav. Diss. 1. 23. t. 3. f. 12 and *S. alba* 22. t. 3. f. 8 (not Linn.). *S. canariensis* (W.) and *S. rhombifolia* (L.) *α* (not *β* ex icon. cit. Cav.) DC. i. 462; Spr. iii. 111.—Mad. reg. 1; r.

Shr. per. Mad. Roadsides and dry waste ground in hot sunny places everywhere along the S. coast chiefly. Throughout the year.—A small shr. with slender stiff straight often elongated simple rounded branches 1–2 ft. long very tough and strong or wiry, hence used occasionally for making small brooms or besoms. Whole plant appearing smooth or merely powdery, but really more or less densely starry-pubescent in all its parts. L. dull gr., more or less whitish or greyish beneath, 1–2 in.

long, $\frac{1}{4}$–$\frac{1}{2}$ in. broad, wedgeshaped and entire towards the base. Fl. small buff or ochre-y. Ped. very variable in length but mostly rather shorter than the l. though sometimes longer especially in luxuriant pl. Fr. small hard and dry. Carpels mostly 10, and by far most commonly 1-rostrate; rarely and perhaps only in pl. growing in poor scanty soil and in the hot dry summer or aut. months birostrate. In the summer of 1845 the carpels of all the pl. in the paths or walks of my own vineyard, which had always borne before, as in subsequent years they again bore, 1-rostrate carpels, produced almost uniformly birostrate carpels. Thus *α* and *β* are rather two forms or states than properly varieties. In Madeira, however (as also in the Canaries apparently from Webb's account), *α* is assuredly the normal state: *β* occurring only here and there occasionally.

This is the pl. generally called "Cha Ingleza" or English Tea-pl. by the Portuguese at present. It is however rarely if ever used in any way.

5. ABUTILON Gaërtn.

††1. A. INDICUM (L.) Wight and Arn.

Inclining to shrubby, all over more or less hoary with very short and close velvety starry pubescence; l. soft finely velvety heartshaped ovate-lanceolate or subobtuse, somewhat lobed irregularly and unequally repand-crenate; stip. linear reflexed; ped. erect mostly longer than the petioles jointed near the fl.; sep. ovate acute; cor. spreading; fr. large of 12–15 scabrous stellately-hispid acute not awned carpels about the length of the sep.—*Abutilon indicum* Wight and Arn. Prodr. Fl. Ind. Or. i. 56. *Sida indica* (L.) and *S. populifolia* (Lam.) DC. i. 471 and 470; Spr. iii. 119.

β. populifolia; l. more or less acuminate; W. and A. l. c.; *S. populifolia* (Lam.) Cav. Diss. 1. 32. t. 7. f. 9; 5. 275. t. 128. f. 2; DC. l. c.; Spr. l. c. *S. Abutilon* Holl's List (not Linn.).—$\frac{\text{Shr.}}{2}$ ann. rarely per. Mad. reg. 1; r. Waste ground amongst vineyards in the neighbourhood of Funchal occasionally, especially about the Quinta do Valle. July–Nov.—St. erect; branches 1–3 ft. long straight and stiff but weak and slender and decumbent or spreading horizontally and trailing, often dusky purplish or violet, hard and woody although the pl. is of scarcely ever more than ann. or bien. duration. L. poplar-like, 1–2 in. long, blunt at the tip, pale gr. inclining more or less to grey or hoary. Fl. rather large and handsome, the size of a shilling, buff or ochre-y. Fr. large and handsome from the neat regular arrangement of the dry papery or bladdery carpels. Pedunc. very variable in length, often not much longer but never shorter than the petioles.

Seeds black beautifully scabrous with pale raised points, rounded at the back.

†††Order XIII. AURANTIACEÆ.

The Orange Family.

Fl. regular. Cal. urceolate or campanulate 3–5-toothed marcescent persistent. Pet. 3–5 or 8 imbricate in the bud. Stam. as many as or multiples of the pet., their fil. more or less combined in sets or free, flattened downwards; anthers erect. Torus a fleshy hypogynous ring or disk to which the pet. and stam. are affixed. Ov. 5–many-celled free surrounded by the annular torus; style 1; stigma thick capitate. Fr. an orange, with a spongy often separable rind and 1–many-celled 1–many-seeded pulp composed of distinct separable juicy vesicles. Seeds affixed to the axis 1–many in each cell or carpel, without albumen; chalaza and raphe distinct. Embryo straight; cot. thick and fleshy 2-auricled at the base; plumule distinct.—Trees or shrubs abounding with aromatic fragrant volatile oil-glands. L. alternate pinnate, but often by abortion of the side-lfts. 1-leaved. Fl. generally white with thick fleshy pet. Fr. mostly edible.—The *Aurantiaceæ* form too marked a feature in the botanical aspect of Madeira to be here omitted. And having had constant and long-continued opportunities of observing them growing in all the luxuriance of native pl., I have been enabled to form conclusions with some confidence as to the true limits of the sp.

†††1. CITRUS. Cal. urceolate 3–5-toothed. Pet. 5–8. Stam. 20–60, fil. flattened dilated downwards and more or less united or 1–polyadelphous. Fr. 7–12-celled, cells many-seeded vesicular-pulpy. Integument of seeds coriaceous. Cot. with very short auricles.—Petioles winged with a single terminal lft.

†††1. CITRUS L. Orange and Lemon.

†††1. C. MEDICA L. Engl. *Citron*; Port. *Cidra* (the tree, *Cidreira*); Fr. *Cedrat, Cedrot*; Ital. *Cedrò*; Sicil. *Citru, Cedru*. Germ. *Zitrone, Citrone*.

Subarboreous armed or thorny; branches stout firm rigid armed with long spines; petioles short thick simple or very narrowly marginate, l. broadly oblong obtuse serrate and when young with the young shoots and fl.-buds purplish or violet; fl. many in a cluster; fr. large more or less oblong with a very thick hard rind and pale pulp.—Lour. Fl. Coch. ii. 465, var. 1; Brot. ii. 281, 2, var. 4; DC. i. 539; Presl 183; Risso Hist.

Nat. de l'Eur. Mérid. i. 442.—Shr. per. Mad. reg. 1, cult. r. In a few gardens in and about Funchal. Fl. and fr. irregularly throughout the year.—The Madeiran form or var. is a low irregularly growing tree or shr. from 5 to 10 ft. high, with no very distinct st. or head, and straggling short thick straight, but somewhat stunted, branches. L. dark-gr. stiff and coriaceous, of the form and size of those of the common Guava (*Psidium pyriferum* L.) or Cherry Laurel (*Prunus Lauro-cerasus* L.); constantly very different from those of any other of its genus. Fl. like those of the Lemon, but many in a cluster. Fr. pale y. large neither umbonate nor mamillate but with the style usually persistent; its rind very thick and fragrant, sometimes rugged, generally smooth and even, with very little slightly acid pulp. —Madeira is justly famous for the excellence and cheapness of its candied citron.

†††2. C. LIMONIUM L.

Arboreous armed or thorny; branches lax or diffuse elongate; petioles slightly winged or marginate; l. ovate-oblong acuminate or acute toothed; young shoots and fl.-buds purplish or violet; fl. solitary or only 2–3 together; fr. mostly oblong or oval rarely globose, always more or less umbonate or mamillate; rind hard and often thick; pulp pale.—*C. Limonum* and *C. Limetta* DC. i. 539. *C. Limonium* and *C. Limetta* Presl 184 and 187.—The principal Mad. var. are:

α. vulgaris; Engl. *Lemon*; Port. *Limaõ* (the tree, *Limoeira*); Fr. *Citron*; Ital. *Limone*; Sicil. *Lumiuni*; Germ. *Limonie.*

A tree 20–30 ft. high with long loosely spreading branches; foliage rather light gr.; l. acuminate; fr. rather large umbonate pale y. with a thickish often roughish rind and very acid pulp. —*C. Limonum* DC. l. c.; Risso i. 423. *C. Limonium* Presl l. c.—Tr. per. Mad. reg. 1, 2, cult. ccc. In gardens about Funchal, &c., everywhere below 2000 ft. Fl. and fr. Oct.–May.

β. dulcis; Engl. *Sweet Lemon*; Port. *Limaõ doce, Lima, Lima de chêiro*; Sicil. *Lumiuni duci.*

A small tree or shr.; fr. globose mamillated, pale y.; rind thin, pulp sweet insipid.—*C. medica* var. 2, Brot. ii. 281. *C. Limetta* DC. l. c. *C. Limetta α. dulcis* Presl 187. *C. lumia* Risso Hist. i. 414.—Small tr. or shr. per. Mad. reg. 1, cult. rr. In a few gardens about Funchal. Fl. and fr. Oct.–May.—Habit altogether of *α*, and with similar petioles and fl., but with l. acute, not acuminate. Fr. pale y. size of an ordinary orange, the knob or nipple at top surrounded by a flat or hollow space. Rind smelling more or less like Bergamot (*Monarda fistulosa* L.).

γ. acida; Engl. *the W. I. Lime*; Port. *Limaõ de Gallinha.*

Habit of *α* and *β*; fr. small globose even, mamillated, pale y.; rind thin, pulp very acid.—*C. acida* Roxb. *C. medica* var. 2, *C. Limon* Lour. ii. 465.—Small tree or shr. Mad. reg. 1, cult. rrr. In one or two gardens at Funchal.—Fr. 1–1½ in. diam.

C. Peretta Risso i. 418 seems to differ from this only in its pear-shaped fr.

††† 3. C. Aurantium L.

Arboreous armed or thorny; branches close crowded forming usually a compact round bushy head; petioles broadly winged; l. ovate-oblong or elliptic acute or acuminate; fl. numerous in thick clusters subracemose pure white; fr. globose more or less flattened at the poles; rind soft more or less acrid or bitter adhering to the more or less high-coloured pulp.—Desf. ii. 215; Brot. ii. 282. *C. Aurantium* and *C. vulgaris* DC. i. 539; Presl 188. *C. Aurantium* and *C. Bigaradia* Risso Hist. i. 349 and 378.—Principal Madeiran varr.:

α. aurea; Engl. *Orange* or *common Orange*; Port. *Laranja* (the tr. *Laranjeira*); Fr. and Germ. *Orange*; Ital. *Arancia* or *Melarancia*; Sicil. *Aranciu.*

A tree 20–40 ft. high with thick very dark-gr. foliage; fr. flattened at the poles golden or reddish-y.; rind even, mostly thickish, rather bitter, pulp sweet.—*C. Aurantium* Lour. ii. 466; DC., Presl, Risso, ll. cc.—Tr. per. Mad. reg. 1, 2, cult. ccc; PS. reg. 1, 2, rr. In gardens in Madeira everywhere; in the north often attaining a height of 60 ft. Fl. Febr.–April. Fr. Aug.–April.—The oranges of the north of the island (Santa Anna, S. Jorge, S. Vicente, Porto da Cruz, &c.), and of these more particularly a sort called *Laranja de embigo*, are much better than those of the south, and are less infested with the maggots or larvæ of the destructive Orange-fly (*Ceratitis citriperda* Macl. Zool. Journ. iv. 482. t. 15) and other Tephritidan or cognate Diptera.—Several subvarieties and monstrosities are cultivated occasionally, such as the Shaddock (*C. decumana* L.), the Maltese, St. Michael, the Double orange, the Forbidden fruit, &c.

β. Bigaradia; Engl. *Seville* or *Bitter Orange*; Port. *Laranja azeda*; Fr. *Bigarade*; Germ. *Pomeranze.*

A tr. 20–30 ft. high; fr. as in *α*, but with a very bitter rind and pulp.—*C. vulgaris* DC., Presl, ll. cc.; *C. Bigaradia* Risso l. c.—Tr. per. Mad. reg. 1, 2; cult. c. Gardens and vineyards here and there general, but much less abundant than *α*. Fl. April, May. Fr. Jan., Febr.—Fr. used for making marmalade and vinegar; sold very cheap, often at 20*d.* per hundred.

†††4. C. NOBILIS Lour.

Unarmed; petioles simple or narrowly marginate not winged; l. lanceolate or elliptic acuminate mostly quite entire; fl. pure white; fr. much depressed and concave at the poles; rind soft not at all bitter or acrid, easily separating from the sweet high-coloured pulp.—Lour. Fl. Coch. 466; DC. i. 540. *C. Aurantium* var. *Mandarinum* Risso i. 378. Var.

β. tangerina; Engl. *Tangerine Orange*; Port. *Laranja Tangerina.*

A dwarfish shr. of delicate habit and foliage with slender crowded branches forming a loose light head; fr. small remarkably concave or umbilicate at the poles with the axis very short, more or less strongly torulose or ribbed at the base, rind very thin.—*C. nobilis β minor* Bot. Reg. t. 211. Shr. per. Mad. reg. 1; cult. $\frac{c}{2}$. Gardens in and about Funchal chiefly; introd. from Lisbon. Fl. March–May. Fr. Dec.–Febr.—A small elegant dwarf shr. not above 4 or 5 ft. high of a delicate habit with small l. and fl. slender graceful tressy branches and light-gr. foliage. L. narrow, acuminate, the tip retuse. Fl. in all stages pure white small and delicate highly fragrant 2–3 in a cluster, subternate; pet. dotted with gr.; stam. 15, in 4 or 5 sets. Fr. rather small 1½–2 in. diam., axis not more than half the transverse diam., deeply hollow at the poles, usually ribbed like a melon at the base, the ribs disappearing upwards; deep red-lead colour with a somewhat rank strong fragrance like common Orange-flowers and Bergamot (*Monarda fistulosa* L.). Rind singularly thin and fragile, separating cleanly and very easily from the pulp, of a tender almost granular substance, and without the usual leathery or spongy inner lining, abounding with volatile oil and coarsely dotted with large conspicuous oil-glands. Pulp composed of rather large sacs or vesicles, deep full orange or red-lead colour, sweet but neither very juicy nor high-flavoured, though highly fragrant and much esteemed by many for its Bergamot-like aroma, and still more perhaps for its elegance, the cells or carpels, which are very small narrow and numerous, often 10–12, being separable as neatly and easily from each other as from the rind. In the middle of the fr. is a large vacant space left by the recession of the edges of the carp., and only partly filled with soft white cottony fibres. Seeds numerous and large; cot. greenish, not white as usual.—Raised from seeds it maintains constantly and steadily its peculiar characters. Grafted on a common Orange (*C. Aurantium a.*) stock, it becomes altogether larger (15 ft. high) and more robust, with rather darker foliage and larger fr., remaining otherwise unchanged. For use, this is the best mode of treatment; for seedling pl. are not only longer in coming into bearing, but their fr. is smaller, and the crop is more scanty and precarious.

It is however, speaking generally, an early, regular and abundant bearer: a tr. not above 4 or 5 ft. high yielding two or three score of fr.; and it is moreover particularly exempt from blight whether of Insects or Fungi.—The large-fruited var. *a. major* (Andr. Bot. Rep. t. 608), with fr. sometimes 5 in. in diam., is the famous Mandarin Orange of China. It does not occur in Madeira.

Order XIV. HYPERICACEÆ.

The St. John's Wort Family.

Sep. 4 or 5 distinct or partly connected mostly persistent often unequal glandular-dotted, imbricate in the bud. Pet. 4 or 5 often glandular-dotted, twisted in the bud. Stam. mostly indefinite numerous and polyadelphous or united in 3–5 sets or bundles; fil. filiform; anth. bilocular versatile. Styles 2–5. Carpels 2–5. Fr. capsular rarely fleshy 2–5-celled 2–5-valved. Seeds minute numerous; embryo straight mostly exalbuminous. —L. without stip. entire mostly opposite and sprinkled with pellucid dots. Fl. mostly y. and cymose.

1. HYPERICUM. Sep. 5 often unequal and more or less united at the base. Pet. 5. Stam. many polyadelphous at the base. Styles 3–5. Caps. more or less completely 3–5-celled. Fl. always y.

1. HYPERICUM L.

St. John's Wort.

* Shrubby. Sep. very unequal. Pet. deciduous. Styles 3–5.

1. H. GRANDIFOLIUM Chois. *Malforada*, i. e. *Milfurada.*

Smooth; branches round *horizontal or declining*; l. *regularly 2-ranked in one plane ovate-oblong*, at first acute, then obtuse or even retuse, heart-shaped amplexicaul or sessile pellucid-reticulate *not dotted*; *cymes few-fl.*; ped. short 2-bracteate; sep. *very entire oblong-lanceolate* somewhat acute much shorter than the cor. presently *reflexed*; styles 3–4.—DC. i. 544. *H. erectum* Buch! 196. no. 324. *Androsæmum Webbianum* Spach in Ann. Sci. ser. 2. v. 362; WB.! i. 50, 51. t. 4 E.—Shr. per. Mad. reg. 2, 3; ccc. Rocks everywhere chiefly above 1000 ft. Sum.–Aut., but at almost all seasons.—Shr. 2–4 ft. high, the branches reddish or cinnamon-brown sparingly divided elongated declining or loosely spreading horizontally with handsome regularly distichous foliage. L. large 1–2 in. long, 1–1½ in. broad very entire slightly glaucous beneath. Fl. rather large but in small bunches. Sep. very unequal and entire slightly punctate 3 or 4 times shorter than the deciduous pet.

Styles elongated filiform, as long as the stam., united only at the base.

It is remarkable that although *H. grandifolium* is common in the Canaries, yet neither the Canarian *H. canariense* L. nor the equally closely allied Azorian *H. foliosum* Ait. (distinguished by its crowded 4-ranked finely dotted rather smaller l., &c.) are found in Madeira.

** Shrubby. Sep. unequal. Pet. persistent. Styles 3.

2. H. FLORIBUNDUM Ait.

Smooth; branches round *upright*; l. *in four rows crowded elliptic-lanceolate* or pointed at both ends sessile *thickly but faintly dotted*; cymes rather *numerously flowered*; sep. irregularly or *minutely serrulate or ciliate* shortly ovate or lanceolate acute or acuminate very much shorter than the cor.; styles 3.—Ait.! Hort. Kew. iii. 104; Buch! 196. no. 325; DC. i. 544? *Webbia floribunda* Spach in Ann. Sci. ser. 2. v. 356; WB.! i. 47. t. 4 B.—Shr. per. Mad. reg. 2; cc. Dry sunny rocks above and near Funchal, Rib. de Joaõ Gomez, Palmeira, &c., at Ponta de Sol, and in the North at Santa Anna, Rib. de S. Jorge, &c., where it is sometimes called "Corno de Cabra." July–Oct.—A small bushy shrub 2–3 ft. high branched proliferously, with stiff erect straight virgate branches leafy only upwards. L. crowded somewhat narrow-lanceolate 1–1½ or 2 in. long, ⅙–⅓ or ½ in. broad rather pale or y.-gr. Pedic. slightly compressed and dilated upwards. Sep. ovate acute or even sometimes acuminate, unequal, alternately longer or narrower and more lanceolate or acuminate, the shorter more especially very minutely ciliate or faintly serrulate, 4 or 5 times shorter than the cor. Fl. middle-sized bright golden-y. in thickly crowded bunches. *Pet. persistent concave or cucullate.* Styles as long as or longer than the stam. *Seeds fungose* reticulate.—DC.'s description seems at least partly ("calyce obtuso" and "fol. impunctatis") to belong to something else, possibly to *Webbia canariensis* WB., or to *W. platysepala* Spach. The present is however the true pl. of the Hort. Kew. by comparison with the original types in BH.

3. H. GLANDULOSUM Ait. *Malforada*, i. e. *Milfurada.*

Smooth; branches round *upright*; l. *two-ranked crowded* elliptic-lanceolate pointed at both ends sessile *thickly and distinctly pellucid-dotted* and *serrulate with black glands*; fl. *crowded* in short compact close cymes; br. and sep. lanceolate acute closely *serrulate with large black glands*; styles 3.—Ait.! Hort. Kew. iii. 107; Buch! 196. no. 330; DC. i. 551; WB.! i. 44. t. 3.—Shr. per. Mad. reg. 2, 3, but chiefly 2; cc. Rocks in ravines

almost everywhere; Rib. de Santa Luzia, dos Cayados, da Metade, Rib. Frio, Curral das Romeiras, das Freiras, Ponta de Pargo, &c., Santa Anna, &c. April–July.—Shr. 3–4 ft. high with stiff but somewhat weak and curved straggling or spreading naked pale yellowish or reddish branches proliferous and leafy only towards their ends; the quite young shoots clothed with a short white cottony or mealy down. L. thickly crowded upwards, somewhat broadly elliptic-lanceolate mostly sessile, the lower sometimes shortly stalked, bright y.-gr. shining as if varnished, 1–1½ in. long, ¼–½ in. broad. L. br. and sep. thickly fringed or serrulate with prominent black glands. Fl.-buds and pet. reddish outside varnished-shining. Sep. slightly unequal alternately narrower and more lanceolate. Fl. not large rather pale dull y. *Pet. persistent flat* scarcely twice the length of sep. sprinkled especially along their edges with a few black glands or dots. Styles as long as stam.—Bourgeau's specimen under this name in the BH. (Pl. Exs. Can. no. 246) is by some mischance or accident merely *H. perforatum* L.

*** Herbaceous. Sep. nearly equal. Pet. persistent. Styles 3.

4. H. PERFOLIATUM L.

Smooth; st. ascending erect compressed and faintly 2-edged; l. ovate or ovate-oblong obtuse subcordate half-amplexicaul thickly pellucid-dotted and more or less sprinkled with a few black glands either all over or towards or at the edge, quite smooth and slightly glaucous beneath; cyme close many-flowered; sep. and br. lanceolate or ovate-lanceolate acute or acuminate copiously dotted with sessile black glands and fringed or ciliate-serrulate with either short simple cilia or stalked black glands; pet. and anth. copiously dotted with black glands.—Linn.! Herb.; Syst. Nat. (ed. 12) ii. 510; Willd. iii. 1462. *H. ciliatum* Lam. Enc. iv. 170, 171; DC. i. 552; Presl 193. *H. dentatum* Lois. Fl. Gall. 499, (ed. 2) ii. 169. t. 17; DC. l. c. *H. montanum* Buch! 196. no. 329 (not Linn.).—Herb. per. Mad. reg. 2; rrr. Curral das Romeiras, bank on the left side of the road descending from the Mount Church a little before coming to the first bridge at the bottom. In Chestnut woods at S. Vicente on the road to the Paul. May, June.—Very slightly and fugaciously glaucous. St. several stoutish often as thick as a small quill simple very stiff suffrutescent at the base 1–2 ft. high, compressed and with a prominent line or edge on each side alternately between the internodes which become gradually longer upwards. L. entire (not toothed as in Lois. t. 17) subcoriaceous, the lower smaller narrower and closer together, the upper larger broader and more remote, ½–1½ in. long, ⅛–½ in. broad, the uppermost shortest and broadest, beneath slightly glaucous and with the nerves or

veins quite smooth, not minutely furry or mealy-puberulous as in true *H. montanum* L.; the upper l. especially more or less black-dotted towards the edges, the dots rather large, sometimes confined to a single row at the edge, always sessile in Madeira, but in Sicilian spec. in HH. and in Cretan in BH. occasionally stalked and fringing the l. Fl. middle-sized subsessile in a close crowded not large forked cyme. Fringe of sep. much shorter than half their breadth. Styles not exceeding the stamens.

5. H. LINARIFOLIUM Vahl.

Smooth; st. ascending stiffly erect round below, compressed and faintly 2-edged upwards, simple straight slender wiry suffrutescent at the base; l. linear-oblong very obtuse or retuse with revolute margins erect half-amplexicaul without pellucid dots but with a marginal row of black glands and a few also sprinkled over the surface at the tip beneath; cyme terminal rather lax; fl. and fr. rather large; sep. lanceolate or ovate-lanceolate subequal subobtuse in the bud, subacute afterwards, thickly dotted and slightly fringed or serrulate with black glands; pet. edged and sprinkled with the same, anth. more sparingly so; styles longer than stam. twice as long as ovary.—*H. Linarifolium* Vahl Symb. Bot. i. 65; Lam. Enc. iv. 180; Brot. ii. 321. *H. linearifolium* Willd. iii. 1470; DC. i. 552; Loisel. Fl. Gall. (ed. 2) ii. 168. *H. linariifolium* EBS. t. 2851; Bab. 60. *H. angustifolium* Buch ! 196. no. 328; Lowe ! Primit. 35 (not Lam.). *H. nubigenum* Lowe ! Hook. J. of Bot. i. 43; Novit. ! 548, App. xii.—Herb. per. Mad. reg. 3 (upper part); $\frac{r}{2}$. Whole surface of the Paul da Serra; summit of Pico Grande and about the Boca das Torrinhas and adjacent peaks at the top of the Lombo Grande; very abundant, but scarcely found eastward of the Curral das Freiras or Pico Ruivo and the Torrinhas. July, Aug.—St. 6–18 in. high several or numerous, at first ascending, then very erect and straight. L. small narrow $\frac{1}{2}$–1 in. long, 1–$2\frac{1}{2}$ lines broad stiff or thickish and coriaceous, the upper very rarely in luxuriant large pl. with here and there one or two pellucid dots. Fl. conspicuous $\frac{2}{3}$ or $\frac{3}{4}$ in. diam. rather pale bright y. a little inclining to buff, reddish outside especially in bud. Sep. nearly or quite equal. Styles 3 divergent much longer than the ov., shorter than the caps. Seeds oblong elegantly crenate-striate lengthways.—In Jersey specimens (St. Catherine's Bay, Aug. 1851, Stevens) in HH., the st. though round below are obscurely 2-edged upwards. In a large luxuriant Asturian spec. from Durieu also in HH., the st. is round nearly throughout, as I have also occasionally found it in robust luxuriant pl. up the Lombo Grande in Madeira. Hence all difficulty regarding the identity of Vahl's pl. on the ground of his describing the st. as "teres," may be considered at an end.

Lamarck l. c. says of the st. "caule ancipiti" in his specific char., and yet has "tiges cylindriques" in his descr. The sep. he calls "obtuses ou à peine pointues," which is sufficiently correct.

6. H. PERFORATUM L. *Erva de S. Joaõ.*

Smooth; st. ascending erect 2-edged much branched at the base; l. oblong or elliptic thickly pellucid-dotted and thinly sprinkled with a few black dots beneath, not reticulate; cyme large close many-fl.; sep. erect narrow-lanceolate very acuminate twice as long as ovary black-dotted; pet. obliquely oblong and with anth. copiously black-dotted; styles divergent longer than stam. or not shorter than ovary.—Brot. ii. 322; EB. t. 295; Buch! 196. no. 326; DC. i. 549; Sm. E. Fl. iii. 325; Presl 192; WB.! i. 43, 44; Koch 146; Bab. 60.

β. *angustifolium* Bab. l. c. (scarcely of Koch); l. narrow linear-oblong or elliptic copiously pellucid-dotted.—Herb. per. Mad. reg. 2, 3; ccc. Banks, mountain-pastures, ravines, &c., everywhere, chiefly from 1000 to 4000 ft. May–Sept.—St. 2–3 ft. long stiff but mostly spreading and declining or decumbent at the base, somewhat bushy downwards with numerous thickly leafy slender side-branches and longer prostrate weak and almost filiform finely leaved shoots at the base. Foliage dark or full gr. L. distinctly acute; only their principal nerves pellucid. Fl. rather large and handsome bright golden-y. in dense ample cymes. Sep. either quite entire or indistinctly subserrulate upwards. Black glands of pet. chiefly at the edge, but not so always on the l. Styles at least twice as long as the ovary.

7. H. HUMIFUSUM L.

Smooth; st. numerous prostrate or procumbent subcespitose slender filiform slightly 2-edged; l. oval-oblong minutely pellucid-dotted, the edges black-dotted beneath; fl. loosely cymose; sep. large leafy broadly oblong or oval obtuse quite entire unequal twice as long as ovary; styles very short.—Brot. ii. 323; Buch! 196. no. 327; EB. t. 1226; DC. i. 549; Sm. E. Fl. iii. 326; Koch 146; Bab. 60.—Herb. per. Mad. reg. 1, 2, 3; ccc. Banks, ravines and mountain-pastures everywhere from 500 to 6000 ft. May–Sept.—A small low much-branched and leafy pl. 3–6 in. high with very slender wiry st. often forming dense mats or tufts. L. small oval or elliptic more or less oblong more or less obtuse. Fl. rather small. Sep. with sometimes a few stalked black glands at the edge. Stam. 15–20. Styles shorter than the ovary.

8. H. QUADRANGULUM L.

Smooth; st. very erect and straight 4-angular, angles slightly

winged, sparingly and shortly branched upwards; l. decussate oblong or elliptic-oval thickly and minutely pellucid-dotted, the margins beneath black-dotted in a row near the edge; cyme large leafy open or spreading; sep. erect equal narrow-lanceolate very acuminate quite entire black-dotted; pet. lanceolate sparingly black-dotted, anth. copiously so; styles divergent shorter than the stam. not much longer than the ovary.—EB. t. 370; Sm. E. Fl. iii. 324; Bab. 60; DC. i. 548 (var. *a*). *H. quadrangulare* Brot. ii. 322. *H. tetrapterum* (Fr.) Koch 147. —Herb. per. Mad. reg. 2, 3; c. Mountain-dells and steep banks in moist or shady spots here and there; general but not abundant. Rib. Frio, R. da Metade, R. de Machico, &c. In the North in ravines above Santa Anna; cliffs above the Passa d'Arêa by the road, &c. July–Oct.—Rather light gr. St. 1–2 ft. high with short remote leafy opposite side-branches. L. 6–9 lines long, 3–4 lines broad, rather small but larger than in *H. perforatum* L. often thinly and obscurely sprinkled beneath with a few black dots besides the marginal row; the lower obtuse, upper acute. Fl. rather pale or lemon-y., reddish in the bud.—This sp. is not included in Von Buch's Madeiran List. Solander in his MS. List of Madeiran pl. has an "*H. ovatum* Masson: Hab. in declivibus rupium:" but no *H. quadrangulum*. And in the Banks. Herb. no Madeiran specimen exists of either pl. It can only therefore be surmised that possibly by *H. ovatum*, *H. quadrangulum* L. might be intended and the name afterwards suppressed by Solander on discovering its identity with the Linnæan sp.; for he has left no record of the char. of his *H. ovatum*.—The Azorian *H. decipiens* Wats. by a specimen in HH. from "S. Michael, 1846," appears not to differ essentially from the present sp.

Order XV. AMPELIDACEÆ.

The Vine Family.

Cal. small entire or minutely 4–5-toothed. Pet. 4–5 alternate with sep. inserted outside a disk or torus, valvate in the bud, in fl. often separating at their base and cohering at the tips like a *calyptra*. Stam. 4–5 opposite the pet., inserted outside the torus. Ovary free 2–6-celled; ovules erect; style 1 very short, stigma capitate. Fr. a grape *i. e.* pulpy and globose like a berry, but not adherent to or coated by the cal. Seeds bony with a horny albumen and erect embryo.—Climbing shrubs or trees with acid watery juices. Lower l. opposite, upper alternate. Fl. small greenish in racemes or thyrses, and like the tendrils often opposite the l.

1. VITIS. Cal. indistinctly 5-toothed. Pet. 5 often cohering at the tips and separating below, forming a calyptra.

Stam. 5. Ov. 2-celled, each cell with 2 ovules. Fr. juicy, properly 2-celled and 4-seeded, but cells and ovules mostly more or less obliterated or abortive.

1. VITIS.

†††1. V. VINIFERA L. **The Vine.** *Vinha* or *Vidêira.*

L. roundish heart-shaped 5-lobed and coarsely toothed.—Brot. i. 300; DC. i. 633; Presl 199; Koch 150.—Shr. or arb. Mad. reg. 1, 2; PS. reg. 1; ccc. Sunny slopes and hill-sides, from the sea up to a height of 2500 ft. everywhere cult., in the South on trellises, in the North on trees; here and there spontaneous. Fl. April–June; fr. Aug.–Oct.—Fl. very fragrant like Mignonette (*Reseda odorata* L.). Var. (principal only):

α. l. less deeply lobed and toothed.

A. fr. globose.

a. fr. black. — *Tinta, Negra molle, Negrinho, Bastardo, Marôto, Ferral, Castellaõ,* &c.

b. fr. white, *i. e.* greenish-y.—*Sercial, Lestraõ, Cara de Moça, Bastardo branco, Sabra,* &c.

B. fr. oval or oblong.

b. fr. white or greenish-y.—*Verdelho, Bual* or *Boal, Babozo,* &c.

β. l. deeply lobed and toothed, lobes subacuminate (Malvazia or Malmsey Vines).

A. fr. globose.

b. fr. white or greenish-y. or tawny.—*Malvazia, M. de cheira, M. baboza, M. roxa, M. da ribeira,* &c.

B. fr. oval or oblong.

a. fr. black, fleshy.—*Alicante,* &c.

Though any attempt at a full or detailed account of Madeiran Wines would be beyond the scope or province of this work, some notice of the produce of a pl. so influential on the natural features and condition, physical and social, of the island may be perhaps expected.—The wine which is generally called Madeira, or commercially "London Particular," is composed of an indiscriminate mixture of the above subvarieties of *α*; the Verdelho grape predominating. The wines called Malvazia or Malmsey, Sercial, Tinta, Bual and Verdelho are made each from the peculiar grape so called without admixture, and are about twice the price of the London Particular or ordinary Madeira. Malmsey

or Malvazia is noted for its sweetness and richness; Tinta (a red wine) for its Portwine-like astringency, Bual and Verdelho (both dry white wines) each for their peculiar high aromas. But Sercial when old and fully ripe—for before 10 or 15 years, even in Madeira, it is too austere and crude for drinking—is perhaps the very finest of dry cordial wines, combining great strength and aroma with the utmost creaminess or softness, without the least trace of either sweetness or acidity. The Sercial Vine is said to have been brought from Hockheim. The fr. though saccharine is so austere that it affects disagreeably the throat when eaten in any quantity.—Tinta owes its Port-wine colour and astringency chiefly to the infusion of a certain portion of the grape-skins in the must during fermentation. In the course of 5 or 6 years in Madeira, 15 or 20 in England, it loses in great measure its peculiarities, becoming pale, like common Madeira.—Although these are the chief wines known in commerce, almost every separate vineyard produces a sort appreciably different from its next neighbour: a difference analogous to that of home-made bread or beer in different houses of the same town or village. The strongest wines are made on the S. coast; those of the N., with few exceptions, being much inferior, are generally distilled into Alcohol or Brandy. Malmsey is grown on the warmest sunniest slopes on or beneath the cliffs chiefly to the W. of Funchal close to the sea, as under the Cabo Giraõ (Fazenda dos Padres), Paul do Mar, Jardim do Mar, &c. But the principal district for the other wines of finest quality is the Estreita, a vast mountain amphitheatre, formed chiefly by the E. slope of the Cabo Giraõ, beginning about a league to the W. of Funchal, and reaching up to a height of from 1500 to 2000 ft. above the sea. The wines of Porto da Cruz, Ponta Delgada, and a few other places on the N. coast are also very excellent: some of the Tinta or red wines of the former district possessing much of the Hermitage character on the spot, although too delicate to bear transport without injury even across the island.—Madeiran grapes in general, though very sweet, have not much flavour comparatively with English hothouse grapes, and are too mucilaginous or fleshy and leathery or thick-skinned to be very good eating. Those of the N. are more juicy, but smaller and with still less flavour.—The Vine is said to have been first introduced

from Cyprus according to Cadamosto (Bowd. Exc. 103), and Candia, *i. e.* Crete, according to Cordeyro (Hist. Insul. 79) shortly before 1445; and it supplanted gradually the Sugar-cane, which had previously formed the staple produce of the island. It is trained in the S. of the island on trellises 3 or 4 ft. high of cane (*Arundo Donax* L.), and in the N. up chestnut or laurel trees called Balsêiros. The ravages of the *Oidium* have however now completely changed again the face of the country. Its first appearance was in the summer of 1852. In 1855 I found the vines almost universally destroyed and rooted up; and supplanted in the S. chiefly by the Sugar-cane, and in the N. by crops of Maize or Indian Corn.

Order XVI. GERANIACEÆ.

The Geranium or Cranesbill Family.

Sep. 5 persistent more or less unequal, the upper one often spurred at the base; imbricated in the bud. Pet. 5 with claws alternate, twisted in the bud. Stam. monadelphous at the base 2 or 3 times as many as the pet., some often regularly abortive. Ov. 5-celled, ovules 2, pendulous. Styles 5 cohering round an elongated axis. Fr. of 5 one-seeded carpels cohering round the long beak-like produced axis or torus, each terminated by its hardened elongated style, which when dry curls elastically upwards separating from the axis and carrying up with it the carpel. Seeds solitary large filling the carp. without albumen: embryo curved folded; cot. leafy plaited convolute.—Herbs or succulent shrubs with acid juices often aromatic. L. stipulate either opposite or alternate with opposite fl.-stalks.

1. GERANIUM. Sep. 5, none spurred. Pet. 5. Stam. 10 monadelphous, alternately larger and with glands at their base. Carp. plain and rounded at top; the long finally recurved or revolute awn smooth inside.

2. ERODIUM. Sep. 5, none spurred. Pet. 5. Stam. monadelphous, 5 fertile with glands at the base, 5 sterile without glands, with broader fil. Carp. with 2 lateral scars or depressions at top; the long finally curled-up and spirally twisted awn bearded inside.

††3. PELARGONIUM. Sep. 5, the uppermost produced at the base into a nectariferous spur adnate to the fl.-stalk. Pet. 5. Stam. 10 monadelphous, 7 fertile, 3 generally sterile. Awns of carp. finally curled-up and twisted spirally, bearded inside.

1. GERANIUM L.

Cranesbill.

* *Batrachioides* Koch. Root strong fusiform simple or branched, forming at the crown a low scaly knob or caudex.

1. G. ANEMONEFOLIUM Herit. *Passas.*

Root more or less caudescent at the crown; st. and leafstalks annual herbaceous more or less pubescent; l. smooth shining peltate palmately 5-partite, the 5 lobes or segments bipinnatipartite; panicle corymbose broad ample repeatedly forked many-flowered compound, ped. 2-flowered forked and with the pedic. and sep. glandulose-hairy; pet. obovate very entire 3–4 times the length of the awned sep., their claw short smooth; carp. smooth varicosely veined; seeds quite even.—BM. t. 206; DC. i. 640; Spr. iii. 71; WB.! i. 20. *G. palmatum,* Cav. Diss. 4. 216. t. 84. f. 2. *G. lævigatum* Buch! 196. no. 335.—Herb. per. Mad. reg. 2, 3; ccc. Wooded ravines on shady or moist rocks and banks everywhere, R. de Santa Luzia, R. Frio, R. de S. Jorge, R. de Janella, &c. &c. March–Sept.—Fl.-st. ann. fork-branched upwards, 1–3 ft. high one or more from the more or less elevated short stem-like root-stock which is rugged and scaly with the remains of former st. and l. L. a peculiar bright shining gr., the root-l. with stalks often a foot long or more and large leafy stipules clothing the root-stock at their base; the limb 8–10 in. diam.; somewhat succulent, very smooth. Panicle level-topped, large and spreading, its divisions thickly clothed with purple glandular spreading hairs. Fl. crowded large and handsome 1–1½ in. diam. bright rose-purple the throat darker. Claw of pet. divergently 2-ribbed inside. Fil. equal very fine and long, dark purple persistent. Fr. small in proportion its beak short smooth, style pubescent. Whole pl. scentless. Varies much in smoothness.—One of the chief ornaments in woods and ravines of the rocks and banks, which it profusely clothes in many places, and enlivens with its bright gr. lucid foliage and fine rose-purple fl. varying in intensity of colour and often pale, but never white. The pl. continue flowering in long succession through the summer; and here and there indeed at almost all seasons.

** *Columbinum* Koch. Root ann. slender simple or branched; ped. 2-flowered.

† Carp. rugose or wrinkled but mostly smooth; seeds even.

2. G. ROBERTIANUM L. **Herb Robert.** *Passinhas.*

Villose-hairy; *st. ascending spreading and diffuse*; l. membranous thin and flaccid subpedate ternate or quinate, the 3–5 lobes or segm. *unequal* stalked bipinnatipartite; pedic. forked

erecto-patent; pet. obovate or obcuneate entire 3-rayed *twice the length* of the closed awned *villose or shaggy equably* 10-*angular cal.*; claw linear quite smooth; carp. simply keeled varicosely wrinkled chiefly upwards.—Desf. ii. 104; Cav. Diss. 4. 215. t. 86. f. 1; EB. t. 1486; Sm. E. Fl. iii. 235, 6; WB. i. 21 (excl. var. β); Koch 155.

β. *maritimum* Bab. (ed. 4) 65; carp. quite smooth with 1–3 very strong transverse wrinkles or plaits at top.—*G. Robertianum* DC. i. 644 (excl. var. β).—Herb. ann. Mad. reg. 2, 3; ccc. Thickets and shady banks in ravines everywhere; R. de Santa Luzia, R. Frio, S. Vicente, &c. Spr., Sum.—A strong or rank foxy-smelling pl. sprinkled all over, especially the cal., with fine soft white hairs, and tinged more or less in all parts with bright red. St. often 1–2 ft. long and diffusely trailing hairy subvillose. L. membranous thin and flaccid hairy somewhat shining but of a dark lurid or dull hoary gr. turning bright red in decay; the middle lobe or segm. mostly a little produced. Cal. shaggy, thickly clothed with long white hairs. Fl. rather large and handsome though much smaller than in *G. anemonefolium*, bright purplish-rose; the pet. and claw together about half an in. long, their limb marked with 3 pale radiating lines. Carp. quite smooth, never "downy" as in the English pl. α. described by Sm. and Bab. and as sometimes in the Canarian pl. according to WB. i. 22, though I find them quite smooth in Bourgeau's Can. specimens, no. 663, both in BH. and HH. Beak stout rather long quite smooth, the style pubescent. Seeds quite even.

3. G. PURPUREUM Vill. *Passinhas.*

Smoothish or but slightly hairy not at all villose; *st. erect* or slightly spreading *often nearly or quite smooth*; l. *somewhat stiff and succulent* or fleshy subpedate ternate or quinate, the 3–5 lobes or segm. *subequal* stalked bipinnatipartite, *the subdivisions distinct* and *mostly narrowish*; pedic. forked erecto-patent; pet. obovate or oblong-oval nearly or quite entire 2-*rayed not much longer than* the closed awned *hairy or pubescent* but not villose *subpentangular cal.*, claw linear quite smooth; carp. smooth simply keeled strongly varicosely wrinkled especially upwards. —Herb. ann. Mad. reg. 1, 2, 3; ccc. Spr., Sum.—Var.:

α. *lucens*; more hairy, l. somewhat stiff or succulent and shining with smaller or narrowish subdivisions.—*G. purpureum* (Vill.) EBS. 2648. *G. Robertianum* β. *purpureum* DC. i. 644. *G. Robertianum* β. Sm. E. Fl. iii. 236. *G. Robertianum* β. *parviflorum* WB. i. 22. *G. Raii* Lindl. Syn. 57. *G. Robertianum* Brot. ii. 71, 72?—A common weed in vineyards, by roadsides, in sunny stony waste ground everywhere, below 2000 ft. chiefly and down to the sea-beach. March–June.

β. *nemoralis*; smoother, l. membranous with broader more leafy subdivisions.—Common on rocky shady banks in woods and ravines chiefly above 2000 ft., growing often intermixed with *G. Robertianum* β; Rib. de Santa Luzia near the Waterfall; bank above the Fountain in Rib. Frio along with *G. Robertianum* β. and *G. lucidum* L. May–July.

A smaller less straggling more upright bushy shorter-branched pl. less powerfully fetid than *G. Robertianum* β, but with the same kind of rank smell, and altogether less hairy, even in *a.* In drying it adheres much less to the paper, and is much less flaccid and membranous. In decay especially it is equally apt to acquire a bright red tinge. St. succulent shining only slightly hairy, often nearly or quite smooth. L. sprinkled with a few short hairs, much smaller and stiffer than in *G. Robertianum* β, with the middle lobe or segm. less produced, and usually with altogether more distinct and somewhat finer narrower divisions, smoother and normally more shining and succulent or firm; for β. is a state merely due to altitude or situation. Fl. small and inconspicuous, the size of those of *G. lucidum* L., their pet. and claw together 3–4 lines long, not much exceeding the sep., pink or rose with 2 darker rays. Cal. pubescent rather than hairy, sometimes nearly or quite smooth, never shaggy or villose, with 10 unequal ribs or angles, but only pentagonal, 5 being alternately less prominent. Carp. smooth wrinkled and seeds quite even, exactly as in *G. Robertianum* β. Beak stout but rather shorter than in the pl. just named, quite smooth; style pubescent.—I have observed this pl. in Madeira many years without finding any variation in the above characters or intermediate states between it and *G. Robertianum* β, although the two are found continually growing intermixed. Few pl. in fact are either more constant in their differences or more easily discriminated. And in confirmation of this view it may be noted, that whilst in higher shady spots *G. Robertianum* β. retains all its hairiness, *G. purpureum* Vill. growing by its side becomes on the contrary smoother.

4. G. LUCIDUM L.

Nearly or quite smooth succulent shining; st. diffuse *subcespitose* ascending; l. roundish-reniform 5–7-fid, lobes obtusely inciso-crenate; pedic. forked erecto-patent; *pet. obovate or spathulate entire* 2-rayed not much longer than the large *pyramidal* strongly and *sharply winged* 5-*angular cal.* which is transversely *clathrate or wrinkled across* between the prominent winged angles; claw long linear pubescent inside; carp. shortly *glandular-pubescent upwards* or at top, 3–5-*keeled* and reticulately wrinkled across.—Desf. ii. 104, 5; Cav. Diss. 4. 214. t. 80. f. 2; Brot. ii. 72; EB. t. 75; DC. i. 644; Sm. E. Fl. iii. 236, 7; Presl

207; Koch 154; Bab. 64.—Herb. ann. Mad. reg. 3; r. Rocky shady banks in ravines; Rib. Frio above the fountain and the bridge; R. de Santa Luzia near the waterfall; Serra d'Agoa along the Caminho Central between Pico Grande and the Encumeado. April–July.—Root long slender simple. Whole plant peculiarly shining and smooth sprinkled only here and there with a few short hairs, brittle and succulent, very apt to become bright red, much branched diffusely, knotty at the joints. Cal. large pale gr., with 5 winged angles, strongly clathrate across between the angles. Sep. rather cuspidate than either awned or mucronate. Fl. small but pretty; limb of pet. bright pink or rose with 2 deeper-col. radiating lines, claw white hairy inside but not ciliate at the edges. Carp. 3–5-ribbed lengthways, the ribs granulate or rugose; beak short smooth slender, style finely pubescent. Seeds even. Cal. after fl. tightly closed, in fr. loose, finally spreading.

5. G. MOLLE L.

Hairy-pubescent; st. diffusely spreading or decumbent; l. mostly alternate roundish-reniform deeply 7–9-fid, the segments wedge-shaped rather deeply trifid; pedunc. solitary short regularly opposite the l.; pedic. forked strongly declining in fr.; *pet. deeply bifid* longer than the cal., *claw very short ciliate* on each side; *carp. smooth* closely wrinkled across obliquely all over, *simply keeled.*—Cav. Diss. 4. 203. t. 83. f. 3; Desf. ii. 102; Brot. ii. 72; EB. t. 778; DC. i. 643; Sm. E. Fl. iii. 237; WB. i. 21; Koch 154; Bab. 64.—Herb. ann. Mad. reg. 1, 2, 3, c; PS. reg. 2; r. Roadsides and waste ground about Funchal, Camacha, &c.; Boca das Torrinhas, up the Lombo Grande in the Curral das Freiras, about 5000 ft. above the sea. PS. roadside at Camacha. Febr.–July.—Slightly hoary-green softly pubescent. St. clothed with longer, l. with shorter hairs; the lower l. on long stalks and sometimes opposite in pairs; the upper always alternate. Ped. shorter than the l. Fl. small cup-shaped $\frac{3}{8}$ in. diam. Pet. with claw $\frac{1}{4}$ in. long, from $\frac{1}{3}$ longer to not quite twice the length of cal., bright deep reddish-purple. Sep. very shortly mucronulate not awned. Cal. not distinctly angular. Carp. quite smooth closely and finely wrinkled; beak very short and all over pubescent like the short style. Seeds smooth to the naked eye, but under a moderate lens very finely but *distinctly reticulate-rugulose*; forming in some sort a transition between the preceding and following sp.

†† Carp. even but mostly hairy; seeds distinctly reticulate or punctate.

6. G. ROTUNDIFOLIUM L.

Softly villose-pubescent grey or hoary; st. diffusely spreading

or procumbent; *l. all opposite in pairs* reniform 5–7-fid, the segm. shallow *broadly and coarsely but not deeply cut and toothed*; ped. solitary short; pedic. forked strongly deflexed or declining in fr.; pet. *oblong-cuneate or spathulate obtuse entire or undivided*, a little longer than the awned cal., *claw not ciliate, slightly hairy inside and outside at the base*; sep. shortly awned; carp. even pubescent clothed with short *spreading hairs*.—Cav. Diss. 4. 214, 215. t. 93. f. 2; Desf. ii. 101; Brot. ii. 72; EB. t. 157; Buch 396. no. 338 (var. fol. profundius incisis, laciniis angustioribus); DC. i. 643; Sm. E. Fl. iii. 240; WB. i. 21; Koch 154; Bab. 64.—Herb. ann. Mad. reg. 1, 2, 3, ccc; PS. reg. 2, $\frac{r}{2}$; SD. 2; rrr. Roadsides, waste ground, vineyards, and beds of ravines everywhere. In PS. at Camacha, top of Pico de Castello, &c. Febr.–July.—At once distinguishable from *G. molle* L. by its pale greyish foliage pale pink or flesh-col. fl. and opposite l. St. scarcely a foot long, often with the leaf-stalks reddish, diffuse or even prostrate, with longer hairs mixed with short close pubescence. L. softly pubescent flaccid and very quickly withering; the lower on long stalks; all in pairs, one l. smaller than the other. Ped. shorter than the l. Fl. small inconspicuous pale rose-pink or flesh-colour. Beak moderately long, and with the style downy. Carp. large somewhat bladdery. Seeds strongly and elegantly netted all over regularly like a honeycomb.

7. G. DISSECTUM L.

Adpresso-pubescent; st. diffuse straggling; *l. opposite in pairs, deeply 5–7-partite*, segm. of the lower many-, of the upper 3-fid, *the laciniæ narrow linear*; ped. short; pedic. forked, declining in fr.; *pet. obcordate* not longer than the awned sep., *claw ciliate* on each side; carp. even pubescent clothed with short *erect hairs*.—Cav. Diss. 4. 199. t. 78. f. 2; Desf. ii. 102, 103; Brot. ii. 73; EB. t. 753; Buch 196. no. 337; DC. i. 643; Sm. E. Fl. iii. 241; WB. i. 21; Koch 154; Bab. 64.—Herb. ann. Mad. reg. 1, 2, 3, c; PS. reg. 2, 3, 4; $\frac{r}{2}$. Borders of cornfields, grassy banks in ravines, mountain pastures, &c., everywhere. Above the Praya Formosa; Rib. d'Escalas, R. de Santa Luzia at the waterfall; Cerca at S. Antonio da Serra, &c. PS. at Camacha; summits of Pico Branco and P. Juliana, &c. Febr.–July.—St. 1–2 ft. long slender weak and straggling clothed like the petioles with short deflexed adpressed pubescence. L. deeply and rather finely cut almost to the base into many linear divisions, firm stiffish closely adpresso-pubescent but not hoary. Ped. shorter than the l. Fl. dark red or bluish-purple but small and inconspicuous, not exceeding the cal. Beak stout of moderate length thickly clothed with spreading glandular hairs; style short and finely pubescent. Carp. rather large and bladdery. Seeds strongly and distinctly netted like the last.

2. Erodium Herit.

Storksbill.

* *Cicutariæ* Webb. L. divided pinnatipartite or pinnate. Cot.-leaves crenate or lobate.

1. Erodium moschatum (L.) Herit. *Malvas.*

More or less pubescent; st. prostrate or procumbent; l. pinnate, lfts. distinct not quite sessile shortly stalked oval or ovate unequally cut and serrate scarcely lobate; stip. broad oval; ped. many-fl.; pet. nearly equal a little longer than the cal., claw very short smooth not ciliate; 5 fertile fil. dilated and 1-toothed on each side at the base; carp. obliquely 1-ribbed at top below the furrow, or with the lower as well as upper margin of the groove below the scar raised and prominent; beak moderate slender minutely adpresso-pubescent.—Cav. Diss. 4. 227. t. 94. f. 1; EB. t. 902; DC. i. 647; Sm. E. Fl. iii. 230; WB. i. 23; Koch 156; Bab. 65. *Geranium moschatum* (L.) Desf. ii. 106; Brot. ii. 74.—Herb. ann. Mad. reg. 1, 2, ccc; PS. reg. 2, 3, c. Roadsides and waste ground everywhere; Mad. about Funchal, Camacha, Ponta de Pargo, &c.; PS. at Camacha and up Pico de Castello. Nov.–June.—A rather coarse weedy pl. with a strong musky smell and light gr. soft flaccid foliage; st. in roads and paths quite prostrate, amongst other herbage more rank and procumbent or diffuse, 4–12 in. long, rather stout and succulent. Root strong fleshy whitish fusiform. L. 3–12 in. long pinnate with rather large and remote lfts. Ped. 4–10-fl. nearly smooth or slightly viscid-pubescent. Fl. small purplish-rose; sep. acute or acuminate scarcely awned; pet. about $\frac{1}{3}$rd longer than the sep. very entire narrow-oblong or elliptic immaculate 3-nerved nearly or quite equal; claw a little darker-col. very short. Fertile fil. with a short membranous narrow wing or border downwards dilated at the base abruptly into a tooth on each side. Barren fil. petal-like lanceolate acuminate. Carp. with the lower margin of the smooth furrow or groove below the large oval hollow pit-like scar on each side the base of the beak at top sharply raised and prominent like the upper margin, forming a single oblique rib on each side under the groove. Beak $1\frac{1}{4}$ in. long, 5 times as long as the sep.

2. E. cicutarium (L.) Herit.

Hairy or hirsute; st. prostrate or procumbent; l. pinnate, lfts. sessile pinnatipartite or deeply pinnatifid and cut; stip. narrow lanceolate; ped. mostly many-fl.; pet. unequal longer than the cal., claw ciliate on each side; stam. smooth, fil. all simple dilated and rounded at the base not toothed smooth; carp. not distinctly ribbed at top, the lower edge or margin of the smooth

concentric furrows below the 2 hollow scars at the base of the beak being subobsolete instead of sharp and prominent; beak moderate slender minutely adpresso-pubescent.—DC. i. 646; EB. t. 1768; Sm. E. Fl. iii. 229; Presl 209; WB. i. 22; Koch 155; Bab. 65. *Geranium cicutarium* (L.) Brot. ii. 75, 6.

ζ. *bipinnatum* DC. i. 647; γ. WB.! l. c. *Ger. bipinnatum* Cav. Diss. 5. t. 126. f. 3. *G. cicutarium* A. *bipinnatum* Desf. ii. 106; strigosely hirsute; l. bipinnatipartite, lfts. deeply and finely divided, with short narrow segm.; ped. 2–4-fl.; fl. slightly ringent, pet. $\frac{2}{3}$, twice the length of cal.

Subv. 1, *rosea*; fl. pink, 2 upper pet. with a pale spot at the base.—Herb. ann. Mad. reg. 3; $\frac{c}{s}$. Open grassy mountain pastures scarcely below 2500 ft.; between the bridge in Rib. d'Escalas and the Poço de Neve, and to the eastward between R. d'Escalas and Pico da Silva; ascent of the Pico das Abobaras beyond Camacha plentifully; Boca das Torrinhas at the top of the Lombo Grande in the Curral das Freiras, &c. March–July.—Root strong fleshy fusiform whitish. Pl. for some time stemless though flowering; then throwing out several prostrate rarely branched st. 2–6 or even 12 in. long, tinged like the petioles and ped. with red and clothed with coarse shaggy white hairs. Whole pl. slightly fetid like *G. Robertianum*. Foliage dark gr. often reddish. L. opposite in pairs hispid finely divided, bipinnatifid or bipinnate with narrow deeply cut divisions; lower primary pinnæ or lfts. remote; rachis or midrib distinct or naked as in *E. moschatum* L. Pedic. in fr. declining or deflexed. Fl. elegant rather large conspicuous bright pink or rose. Sep. shortly awned or mucronate. Pet. obovate-oblong entire twice the length of the sep. the 2 upper smaller; each of the 3 lower with 3 dark lines or nerves at the base; claw in all copiously ciliate. Sterile fil. half the length of fertile, lanceolate membranous large, petal- or chaff-like. Glands at base of 5 fertile stam. notched, dark red. Anthers rose or purple darker than the pet. Stigmas purple rather long. Carp. narrow-oblong, attenuated downwards, clothed all over with short erecto-patent hairs below the obsolete lower edge or margin of the smooth furrows or grooves under the 2 deep pit-like scars at top. Beak 1¼ inch long 4 or 5 times the length of sep. and with the style clothed with short white strigose close-pressed pubescence; its valves lined with yellow or tawny silky hairs.—Pet. very caducous and fugacious, always falling before noon. Cotyledon-l. undivided 3–5-lobed.

Subv. 2, *albiflora*; fl. pure white. Herb. ann. PS. reg. 3; r. Roadside, Camacha, under Pico de Castello; north slope of Pico de Cabrito near the Ninho de Guincho. April, May.—Differs from the Madeiran pl. in no respect except the pure white fl.

On its first appearance in March this pl. is stemless with a central 2-flowered ped., flat-spreading leaves, and fl. larger than afterwards: excepting the more finely divided lfts. resembling (though not the same as) var. *a. præcox* DC. (*Ger. præcox* Cav. Diss. 5. 272. t. 126. f. 2). It soon sends out several branches, which are at first quite prostrate. Later in the season luxuriant robust pl. with diffuse ascending branches often a ft. long, almost assume the form of *Ger. Chærophyllum* Cav. Diss. 4. 226. t. 95. f. 1 (*Erodium cicutarium* γ. DC.), but with which they are certainly not identical. These 2 states or stages of the sp. (the stemless and luxuriant) are however doubtless the pl. intended by *Erodium cicutarium* α. and β. WB. l. c., excluding the references to Cavanilles.

3. E. BOTRYS (Cavan.) Bertol. *Agulheta.*

Hispid or strigose; st. ascending diffuse or spreading, and with the petioles thickly clothed with reflexed bristles; l. oblong obtuse subcordate, the lower undivided sinuate or sinuate-lobate crenate with shallow very obtuse lobes and teeth, the upper more deeply and finely divided or bipinnatifid, sharply cut and toothed with narrow linear segments; stip. ovate; ped. 2–4-fld.; pedic. in fr. strongly reflexed; pet. unequal $\frac{2}{3}$, a little longer than the always close-pressed sep., claw slightly pubescent not ciliate; stam. smooth, fil. all simple dilated downwards not toothed at the base smooth; carp. obliquely 3–4-ribbed on each side at top below the furrow; beak very large about 8 times the length of sep. finely pubescent.—DC. i. 647; Spr. iii. 34; WB.! i. 23. *Geranium Botrys* Cav. Diss. 4. 218. t. 90. f. 2; Brot. ii. 74. *Ger. strigosum* Buch! 196. no. 334. *Ger. ciconium* var. Desf. ii. 113.—Herb. ann. Mad. reg. 2, 3, ccc; PS. reg. 3, $\frac{1}{2}$. Sunny banks, mountain pastures and hills everywhere, but scarcely below 500 ft. PS. on N. side of Pico d'Anna Ferreira. Jan.–June.—Foliage rather dull greyish or bluish, dark gr. Root strong fusiform. St. several ascending more or less erect diffusely spreading stout 2–12 in. high mostly reddish on upper side clothed with copious short coarse harsh white cartilaginous deflexed bristles. Cot.- and root-l. lying flat to the ground undivided 3–4-crenate or lobate about 2 in. long and 1 in. broad, the upper more deeply cut or gashed nearly to the midrib: all somewhat rigid or stiffish and adpressedly hispid principally on the nerves, opposite, dark gr. and shining with a dull leaden lustre. Ped. mostly 2-fl. stout reddish and with pedic. and cal. often finely viscose-pubescent. Fl. rather large and conspicuous somewhat ringent; pet. not more than $\frac{1}{3}$rd longer than the mucronate or shortly awned sep. pale rose-purple, with

5 dark veins or lines, 3 only reaching up the limb, immaculate obovate-oblong entire or merely a little erose at the edges, the 2 upper rather smaller. Barren fil. lanceolate acuminate membranous or petal-like; fertile not much longer. Anthers black. Stigmas short bright gr. Carp. narrow-oblong strigose below the 3 or 4 oblique ribs at top on each side beneath the smooth groove or furrow. Beak enormously and singularly large in proportion, 3–4 in. long slender and finely acuminate slightly angular minutely pubescent.—Pl. extremely variable in size and luxuriance rarely exceeding or even attaining a ft. in height; often dwarfed down to a single st. an in. or two high, when the enormous length of the beak becomes peculiarly striking. Seed-l. undivided indistinctly 5-lobed with very shallow notches. Cavanilles' figure is from a pl. with immature half-grown fr. having the beak only $1\frac{1}{2}$ in. long; but is otherwise highly characteristic of the Madeiran pl.

** *Malacoideæ* Webb. L. scarcely divided, 3–5-lobate; cot.-leaves entire.

4. E. MALACOIDES (L.) Willd.

Softly pubescent somewhat grey or hoary; st. prostrate or procumbent; l. cordate obtuse toothed or crenate slightly and very obtusely lobed *all undivided*, the uppermost oblong; stip. large ovate membranous; ped. 4–6-fl.; pedic. in fr. strongly reflexed; cal. in fr. *loosely erect not close-pressed*; pet. equal a little longer than the *shortly awned sep.*; claw ciliate; *fil. smooth* lanceolate rounded and simple (not toothed) at the base; *carp. obliquely* 1-*ribbed at top below the groove* or with the lower edge as well as upper margin of the groove sharply raised and prominent; beak 3–4 times the length of cal. rather long and slender *smooth*. —Buch 196. no. 333?; DC. i. 648; Presl 210; WB. i. 24; Koch 156. *Ger. malacoides* (L.) Cav. Diss. 4. 220. t. 91. f. 1; Desf. ii. 107, 8; Brot. ii. 74.—Mad. reg. 1, 2, ccc; PS. reg. 1, 2, rrr. Roadsides and waste ground in sunny places about Funchal, the Gorgulho Fort, Praya, the Piedade near Caniçal, &c. chiefly below 500 ft. and near the sea. PS. near the S.W. point (Ponta de Malhado) and in the Serra Dentro. Nov.–May.—Whole pl. more or less pubescent, pale dull greyish-gr., though sometimes in shady places scarcely perceptibly hoary, with soft flaccid foliage. St. diffusely prostrate long and trailing 1–2 ft. long, the ends ascending, sparingly branched, light shining gr. pubescent especially beneath in a thick downy line. L. little more than an inch long and $\frac{3}{4}$ in. broad, ovate or ovate-oblong, the lower as broad as long, the upper more oblong, all undivided slightly shallow-lobed and toothed. Stip. and br. large conspicuous dry pale brown. Fl. small inconspicuous. Sep. shortly awned hairy-pubescent with strong dark gr. ribs or

nerves on a light ground. Pet. dull purple with mostly 2 small oblong darker spots at the base of each, oblong-oval obtuse entire, $\frac{1}{5}$ in. long, $\frac{1}{8}$ in. broad; the claw very short and distinctly ciliate. Fertile fil. winged purple; 5 sterile more broadly lanceolate petal- or chaff-like pale or colourless: all simple at the base and quite smooth. Carp. thickly erecto-strigose with long white tawny hairs up to the raised rim-like lower margin of the smooth groove below the large hollow scar or pit at top: both scar and groove thickly sprinkled with shining sessile glands. Beak an inch long, nearly smooth minutely and slightly adpresso-subpuberulous chiefly upwards. Seeds smooth shining.—In drying the pet. turn bluish-purple. Whole pl. scentless, occasionally in luxuriant young states viscid. Pet. very fugacious mostly falling before noon. The carp., in the raised rim-like lower margin of the groove below the scar forming a single oblique rib on each side at top, exactly resemble those of *E. moschatum* (L.); and they are also equally attenuated downwards at the base into a kind of stalk.

Of 2 spec. in BH. on the same sheet, marked "*Erodium malacoides*—*Ger. malacoides* L. Madeira, Fr. Masson," the smaller may possibly be rightly so called, but the larger is certainly the next sp. *E. chium* L. Von Buch's synonym is therefore doubtful, since he only enumerates one of the 2 species.

5. E. CHIUM (L.) Willd.

Shining and moderately pubescent; st. diffuse or procumbent, *l. shining and often nearly smooth above*, cordate obtuse toothed deeply and very obtusely pinnatilobate *subtripartite, the upper tripartite*; stip. short broadly ovate membranous, ped. many-fl.; pedic. in fr. declining or deflexed; *cal. in fr. close-pressed*; pet. unequal longer than the *long awned sep.*; claw ciliate; *fil. hairy and ciliate downwards* simple at the base; *carp. simple not ribbed at top and without any groove at all* below the 2 small round pits or scars at the base of the beak which is 6 times the length of cal., long slender, *finely adpresso-pubescent.*—DC. i. 647; Spr. iii. 33. *Ger. chium* (L.) Cav. Diss. 4. 221. t. 92. f. 1.—Herb. ann. Mad. reg. 1, r; PS. reg. 1, 2, cc (called Alfinête); SD. reg. 2, r. Madeira, Brazen-head outside the hummock at top, and roadside at the top of the descent into the Porto Novo ravine on the road from Funchal to Santa Cruz. In PS. common in waste ground, especially under walls on the borders of cornfields, quite taking the place of the Madeiran *E. malacoides* (L.). In SD. near and at the top of the island.—Herbage of a bright light shining gr. smoother or at least appearing so than in *E. malacoides* (L.) with brighter-coloured more conspicuous pink fl. St. more erect, yet weak and diffuse or straggling, 1–3 ft.

long. L. larger 2 or 3 in. long and nearly as broad, deeply cut into 3 main lobes, each of the side ones 2-, the middle rather longer and less deeply 3-lobed; the uppermost distinctly tripartite. Ped. 4-fl. and upwards. Stip. pale brown dry and scarious. Sep. always close-pressed thickly hairy, with strong green nerves or ribs on a pale transparent filmy ground; awn half their length. Fl. small but conspicuous and pretty. Pet. pale but bright pure rose, immaculate, 3-nerved, just longer than the sep. with their awns, unequal, $\frac{2}{3}$, the 2 upper broader and oval, the 3 lower narrower and oblong or elliptic; claw very short abrupt pubescent inside and strongly ciliate with deflexed rather long hairs. Fertile fil. winged and dilated downwards; 5 sterile ovate or broadly lanceolate acute petal-like pink or rose-colour, all hairy or shortly ciliate downwards and simple or not toothed at the base. Glands at base of fertile stam. notched bright gr. Stigmas dull dark rose. Carp. thickly but finely pubescent with short close-pressed white silky hairs, without any grooves at all below the small round scars at the top and consequently without any rib. They are also shorter and plumper, broader above and less narrowed below, than in *E. malacoides* L. Beak 1–1$\frac{1}{4}$ in. long, slightly pubescent.—Pet. very fugacious, falling mostly before noon. A very elegant and ornamental rock-work pl. in gardens near the sea in England, which it enlivens by its bright gr. foliage and pink abundant fl. opening in long succession.—It is curious that *E. chium* L. is as common and *E. malacoides* L. as rare in PS. as *E. malacoides* L. is common and *E. chium* L. rare in Madeira.

3. PELARGONIUM Herit.

Garden Geraniums. *Malvas.*

* Herbaceous.

†††1. P. ALCHEMILLOIDES Willd.

"St. diffuse villose; l. cordate 5-lobed palmate; ped. few-fl., pet. nearly equal, stigmas sessile."—DC. i. 660. *Geranium alchemilloides* (L.) Cav. Diss. 4. t. 98. f. 1.—Herb. per. Mad. reg. 1, 2; r. A mere outcast of gardens about Funchal here and there; as on the brink and down the rocky E. cliff of the Rib. de S. Joaõ a little way above the Peak Fort over against the Achada, &c. Spr.—Greyish or slightly hoary scentless. L. orbicular. Ped. long slender 4–6-fl. Fl. small pale y. or whitish. Pet. narrow.

** Shrubby.

††2. P. INQUINANS (L.) Ait. *Malvas.*

Velvety-pubescent; st. and branches erect stiff thickish succulent; l. orbicular-reniform very obtusely crenate-lobed light

uniform gr. slightly shining softly velvety, ped. many-fl.; pet. obovate-wedgeshaped unequal uniform red.—DC. i. 659; Spr. iii. 58. *Ger. inquinans* (L.) Cav. Diss. 4. 243. t. 106. f. 2. "Dill. Hort. Elth. t. 125. f. 151."—Shr. per. Mad. reg. 1; cc. Sea-cliffs for about a mile out of Funchal to the E. along the Caniso road, and elsewhere amongst thickets of Cactus everywhere on the S. coast and for some distance up the Ravines, completely naturalized. Throughout the whole year.—A low shr. 1–3 ft. high with thick short stiff fleshy or juicy gr. branches. L. 3 or 4 in. diam. thickish softly tomentose light grass-gr. but usually with a reddish tint, being powdered with the fine red tufa-dust of the soil which clings tenaciously to their velvety surface, staining the fingers when rubbed or handled. Fl. bright scarlet, throat or claw of pet. white. Pet. $\frac{2}{3}$, the 2 upper rather smaller; 2 of the 7 fertile stam. very short.—L. with an acid not aromatic scent when rubbed or bruised, unpleasant to some people; not staining the fingers except by their dustiness; varying in summer more, in winter less, densely velvety or tomentose.—*P. Bentinckianum* DC. i. 664. of English gardens, and very frequent in those of Madeira, scarcely differs except in its somewhat thicker more tomentose or greyish l., and larger more brilliant intense-scarlet fl. In cold or wet winters I have seen it pass completely into the wild or naturalized pl. above described.

†††3. P. GRAVEOLENS Ait. *Malvas.*

"L. palmately 7-lobed, l. oblong obtuse toothed with the margins revolute, umbels many-fl. subcapitate, spur twice as short as the cal."—DC. i. 678; "Herit. Ger. t. 17." *G. terebinthinaceum* Cav. Diss. 4. 250. t. 114. f. 1.—Shr. per. Mad. reg. 1, 2; ccc. Used everywhere in ornamental clipped hedges about gardens and Quintas. The Mount, Camacha, Palheiro, S. Antonio, Machico, &c. &c. Throughout the year. St. 1–3 ft. high diffuse but stiff and bushy, scarcely succulent. L. softly and thickly pubescent pale gr. Fl. in thick crowded tufts uniform pale dull pink not handsome. Pl. with a strong disagreeable though subaromatic scent.

†††4. P. GLUTINOSUM Ait. *Malvas.*

"L. cordate hastate-5-angular toothed viscose smoothish, umbels 2–4-fl., spur a little longer than the cal."—DC. i. 679; BM. t. 143. *Ger. viscosum* Cav. Diss. 4. 246. t. 108. f. 1.—Shr. per. Mad. reg. 1, 2; ccc. A frequent outcast of gardens and used for hedges everywhere about country houses.—St. diffusely spreading 2–4 ft. long. L. large sinuate like oak-leaves highly glutinous or viscous, dark gr. with a darker blackish waved broad zone. Fl. large and handsome more or less pale pink or rose, the 2 upper pet. larger and broader, spotted, and streaked with dark purple. Pl. with a strong but to many

people not altogether disagreeable scent, something like that of a tan-yard, but combined with a pleasant aroma.

Several other sp. of shrubby garden *Pelargonia* are very common or occasionally almost semi-naturalized. But the two preceding are the most generally or abundantly diffused.

Order XVII. LINACEÆ.

The Flax Family.

Sep. 5 or 4 persistent imbricate. Cor. regular. Pet. 5 or 4 fugacious clawed twisted in the bud, sometimes cohering. Stam. 5 or 4 alternate with the pet., with intermediate teeth (abortive stam.), from a hypogynous ring or disk. Ov. 5–4-celled. Stigmas 5 or 4 capitate. Caps. tipped with the hardened remains of the styles, imperfectly 10- or 8-celled, *i. e.* each of the 5 or 4 complete cells more or less completely subdivided by a spurious partial dissepiment. Seeds 1 in each spurious cell compressed pendulous with little or no albumen. Embryo straight.—L. alternate without stipules veinless, entire.

1. LINUM. Sep. pet. and stam. 5. Styles 5, rarely 3. Caps. 10-celled 10-valved, rarely 6-celled 6-valved.
2. RADIOLA. Sep. 4 connected downwards, each deeply 2–3-fid. Pet. stam. and styles 4. Caps. 8-celled 8-valved.

1. LINUM L.

Flax.

* Edge of sep. glandular-ciliate. Fl. yellow.

1. L. GALLICUM L.

Herbaceous smooth; st. single mostly simple erect; l. linear-lanceolate minutely serrulate-scabrous at the edge; panicle loose corymbose, its branches angular quite smooth; sep. lanceolate glandular-ciliate downwards, attenuated upwards into a sharp roughish point, half as long again as the caps.; pedic. in fr. a little longer or a little shorter than the cal.—Brot. i. 483; Buch 196. no. 350; Presl 169; WB. i. 27; Koch 138. *L. gallicum* β. *medium* DC. i. 423. *L. aureum* Waldst. and Kit. ii. t. 177 (not DC.).—Herb. ann. Mad. reg. 1, 2, 3; ccc. Sunny hill-sides and mountain pastures everywhere; neighbourhood of Funchal at the top of rocks between the Valle Quinta and R. de Joaõ Gomez; Curral das Romeiras; at Camacha, Prazeres, &c. May–Sept.—A small delicate inconspicuous pl. from 2–10 in. high. St. sometimes but rarely branched from the base, otherwise simple erect straight slender

or filiform. Fl. very small golden-y. in a loose capillary corymbose panicle. Pet. about ⅓rd longer than the finely acuminate or subulate-pointed sep., very obtuse or truncate, erose or uneven at the edge, cohering laterally by the middle of their claw and thus all falling together. Styles 5. Branches of panicle not downy in the axils as in *L. corymbuliferum* Rchb. (*L. aureum* DC. not Waldst. and Kit.). Pedic. in fr. longer than the cal. only in the earlier or lower primary first-opening fl.; in the later or secondary upper fl. they are shorter.

2. L. STRICTUM L.

Herbaceous smooth; st. single or several from the base simple stiffly erect thickly corymbose at top and leafy; l. crowded stiff linear-lanceolate very scabrous and minutely ciliate-serrulate at the edges; panicle dense corymbose leafy; sep. lanceolate sharply acuminate or produced into a long rough glandular-ciliate or serrulate point, twice as long as the caps.; pedic. in fr. much shorter than the cal.—Desf. i. 278; Brot. i. 484; DC. i. 424; Spr. i. 964; Presl 169?; WB. i. 26; Koch 138.—Herb. ann. Mad. reg. 1, r; PS. reg. 1, 2, c. Cornfields and sunny waste ground near the sea in a calcareous sandy soil; in Madeira scarcely except about the Fossil-bed at the Piedade near Caniçal; in PS. general, Rib. de Cochino, towards the Fonte d'Arêa, &c. April–June.—A remarkably stiff rigid leafy pl. 2–10 in. high, the st. very erect and leafy. Panicle forked proliferously, thickly leafy and bushy or crowded, with densely aggregate very shortly stalked golden-y. very small fl. almost buried in the l.; sep. membranous below, their long produced rough stiff point herbaceous; in fr. pale whitish and stiffly membranous or horny downwards; pet. acute shorter or not longer than the long-pointed conspicuous sep. Caps. globose slightly pointed, smooth inside.

†††3. L. TRIGYNUM Roxb.

Shrubby smooth; root creeping; l. alternate elliptic pointed at each end, fl. bracteated trigynous.—BM. t. 1100; DC. i. 425.—Shr. per. Mad. reg. 1, cult. cc; subnat. r. On terrace-walls and waste ground here and there in or about Funchal, and a very common ornament of gardens. Oct.–June.—Roots sending up turions or suckers. St. 1–2 ft. high dark gr. like the l. which are 1–2 in. long and nearly sessile. Fl. very large and handsome 2 in. diam. bright golden-y. produced in vast profusion and in long succession throughout the winter or spring months.

** Edge of sep. not glandular. Fl. blue.

4. L. ANGUSTIFOLIUM Huds. *Linho bravo.*

Herbaceous smooth; st. numerous procumbent; l. linear-

lanceolate; panicle few-fl. corymbose; sep. ovate or ovate-lanceolate acuminate pointed nearly as long as the ripe caps., the inner slightly ciliate; pet. twice as long as cal.; caps. downy or mealy within.—EB. t. 381; DC. i. 426; Sm. E. Fl. ii. 119; WB. i. 27; Koch i. 139; Bab. 66. *L. agreste* Brot. i. 481. *L. angustifolium* β. DC. l. c. *L. perenne* Buch 196. no. 349 (not Linn.). —Herb. ann. Mad. reg. 1, 2, c; PS. reg. 1, 2, c. Roadsides, waste ground and borders of cornfields everywhere, chiefly above 500 ft. March–June.—Root tap-shaped simple white, decidedly and constantly only annual in Madeira though soon becoming thickened and woody at the crown and assuming quite a perennial appearance. Primary st. erect 2 or 3 in. high not flowering, of very short duration. From its base spring at first 1 or 2 then subsequently from 3 or 4 to 10 or 12 slender st. 5 or 6 in. to a ft. long, spreading on all sides close to the ground, their ends ascending or erect, woody and suffrutescent downwards, sparingly branched upwards and few-fl. L. small 3-nerved crowded and imbricated upwards, close-pressed, slightly glaucous. Ped. proliferous; pedic. erect in fr. Fl. rather large but a little smaller than in common Flax, pale lilac-blue; pet. twice as long as sep., $\frac{3}{8}$ in. long, half as broad, obtuse wedge-shaped, entire in Madeiran specimens; styles 5; fil. dilated downwards, without intermediate teeth or rudiments of abortive stam. Sep. 3–5- or even 7-nerved at the base, their edges membranous and slightly ciliate-serrulate. Caps. globose abruptly sharp-pointed, a little longer than the cal.; its larger dissepiments very slightly downy or rather mealy.

†††5. L. USITATISSIMUM L. **Flax.** *Linho.*

Herbaceous smooth; *st. single erect*; l. lanceolate; panicle lax corymbose; pet. 3 times as long as cal.; *sep. ovate* acuminate pointed ciliolate nearly as long as the *caps.* which is *smooth within.*—Desf. i. 277; Brot. i. 481; EB. t. 1357; DC. i. 426; Sm. E. Fl. ii. 118; Presl 170; Koch 140; Bab. 66.—Herb. ann. Mad. reg. 2, cult. cc; reg. 1, 2, subnat. c. Generally cultiv. as a crop, especially in the north at S. Anna, S. Vicente, &c.; and here and there springing spontaneously, as towards the Praya W. of Funchal, &c. Dec.–June.—St. solitary slender erect 1–1½ ft. high corymbosely branched upwards, of a peculiar light pleasant gr. Fl. large conspicuous, blue with darker veins. Pet. crenate.

A great proportion of the linen used in Madeira is spun and woven by the country-people with flax prepared from their own crops; and it is of excellent quality and very durable.

2. Radiola Gm.

Flax-seed.

1. R. millegrana Sm.

Hort. Kew. (ed. 2) i. 282; EB. t. 893; Sm. E. Fl. i. 243; Spr. i. 498. *R. linoides* (Gm.) DC. i. 428; Koch 141. *R. vulgaris serpyllifolia* Dill. in Ray's Syn. 345. t. 15. f. 3. *Linum Radiola* Linn., Brot. i. 485.—Mad. reg. 2; cc. Mountain pastures general; rocky ridge between the Quinta do Valle and Rib. de Joaõ Gomez; grassy hills up the Caminho do Meio and about Camacha, &c. April–June.—A minute inconspicuous delicate little pl. of short duration, 1 or 2 in. high, erect and smooth, bushy and regularly forked or branched dichotomously from the base, branches filiform or capillary stiff corymbose. L. opposite entire very small sessile ovate. Fl. white very minute and numerous stalked solitary from the forks of the st. and at the ends of the branches. Sep. sharply and deeply trifid.

Order XVIII. OXALIDACEÆ.

The Wood-sorrel Family.

Fl. regular. Sep. 5 equal persistent imbricate in bud. Pet. 5 equal clawed often cohering at the base twisted in bud. Stam. 10 monadelphous in 2 rows, the 5 inner opposite the pet. longer than the 5 outer. Ov. 5-celled; ovules 1 or more in each cell; styles 5, stigmas capitate. Caps. 5-lobed 5-celled 5–10-valved or fleshy. Seeds not numerous 1 or more in each cell often with an elastic fleshy epiderm (*arillus* Endl.). Embryo straight in a fleshy albumen.—Pl. with acid juices, often stemless. L. mostly trifoliate.

1. Oxalis. Fr. an oblong or cylindric 5-angular 5-celled 5-valved caps.

1. Oxalis L.

* Branched; ped. axillary; lfts. ternate.

1. O. corniculata L. *Bolsa de Pastor.*

Pubescent; root fibrous without turions or tubers; st. diffuse with procumbent often rooting branches; lfts. obcordate; stip. oblong-lanceolate adnate to the petioles; ped. 2–5-fld. shorter than the leaves; pedic. in fr. reflexed; caps. narrow-oblong; seeds transversely ribbed.—Brot. ii. 223; EB. 1726; Buch 196. no. 339; DC. i. 692; Sm. E. Fl. ii. 324; Presl 212; Spr. ii. 429; WB. i. 25; Koch 157; Bab. 68. *O. pusilla* Salisb. in Linn. Trans. ii. 243. t. 23. f. 5.—Herb. ann. Mad. reg. 1, 2, 3; ccc. Roadsides, waste and cultiv. ground everywhere; one of the

commonest weeds in gardens and vineyards. Throughout the year.—Truly ann. propagating only by seeds. St. 4–12 in. long reddish or purplish. Fl. small mostly 2 or 3 in little umbels, y., the throat with a reddish spot on each pet. Stam. distinctly monadelphous downwards. Styles the length of the longer stam. Caps. large in proportion. The pl. is used for rubbing out stains of iron-rust &c. from linen.

** Stemless; ped. from the root many-fld. umbellate; lfts. ternate.

††2. O. MARTIANA Zucc.

Root solitary scaly producing turions; pl. shining somewhat hairy-pubescent; lfts. broad ample widely obcordate deeply notched almost 2-lobed plain-coloured ciliate somewhat hairy all over chiefly beneath; scapes pubescent umbellate slightly branched rather numerously fld. scarcely longer than the l.; umbel lax compound loosely branched; pedic. lax drooping slender flexuose or reflexed; sep. a little obtuse with 2 callous spots at the tip; pet. narrow ligulate-wedgeshaped distinct; styles halfway between the longer and shorter stam.—Zucc. Mon. p. 20; Nachtr. p. 27; BM. 3938. *O. urbica* Hil. Fl. Bras. Merid. i. 126; Spr. Cur. post. iv. 185. "*O. floribunda* Link and Ott. Abbild. Gew. t. 10" (ex Zucc.).

β. *bipunctata*; scapes and pedic. hairy, fl. pale v. or lilac.—*O. bipunctata* Graham in BM. 2781, opt.—Herb. per. Mad. reg. 1; r. A weed in vineyards and gardens about Funchal here and there, as about the Quinta do Valle, &c. Nov.–May chiefly. Remarkable for its very large lfts. about 1½ in. long and broad, of a lucid bright full gr. on both sides. Scape about 6 in. long. Umbel loose with long fl.-stalks often compound. Fl. not large, about the size of those of *O. Acetosella* L.—Root merely ann. but propagated perennially from year to year by successive turions or tubers.

††3. O. CERNUA Thunb.

Root simple fusiform scaly at the crown and turion-bearing; pl. sometimes slightly caulescent smoothish; lfts. deeply obcordate or bilobed slightly ciliate smooth above, dark-spotted or blotched; scapes umbellate many-fld. longer than the l.; umbel simple crowded close; pedic. drooping or reflexed very unequal, some elongated.—DC. i. 696; Spr. ii. 426. *O. caprina* Curt. (not Linn.) BM. t. 237 (with single fl.).

β. *pleniflora*; fl. double.—Herb. per. Mad. reg. 1; c. Roadsides, vineyards and gardens about Funchal in many places; Caminho dos Saltos a little above the "Deanery," &c. Nov.–May.—Root simple fusiform fleshy white reddish or purplish upwards annual propagating from year to year by numerous

scaly turions or tubers produced copiously at its crown. L. remarkably flaccid or fast-withering forming a thick tuft, lfts. bright gr. spotted like Dutch Clover (*Trifolium repens* L.) somewhat fleshy the 2 lobes very distinct or deeply divided, folded together. Fl. very numerous in dense umbels large and handsome bright sulphur or lemon y., always in Madeira double; pet. especially in the bud bright reddish outside.

*** Stemless; scapes from the root single-fld.; lfts. ternate.

††4. O. PURPUREA Jacq.

Root fibrous tuberiferous; pl. subpubescent; l. in a flat rose-like tuft prostrate; lfts. broad rounded ciliate thickish or fleshy and glaucous, the middle one wedgeshaped at the base; petioles short villose; scapes ascending pubescent rather longer than the l., with a pair of narrow br. below the middle; sep. acuminate pubescent; cor. broadly infundibuliform; pet. broadly rounded-obovate imbricated laterally; styles reaching halfway between the longer and shorter stam. and with the fil. of the latter glandulose.—Jacq. Oxal. t. 56 (not Linn.); Willd. (ex DC.) sp. 2. 778; DC. i. 699 (var. *a*); Spr. ii. 424.—Herb. per. Mad. reg. 1, 2; cc. In chestnut woods chiefly from 1000 to 2000 ft. everywhere most abundant covering the ground and in vineyards and gardens a frequent weed; at the Mount, Allegria, Camacha, &c. Dec.–April.—Forming in many places for 2 or 3 months quite a turf in the chestnut woods. L. close-pressed to the ground rather large with very short petioles 1–2 in. long; lfts. large stiffish of a leaden or dull glaucous dark gr. paler beneath, in withering often turning blackish-purple or livid-violet at the edges. Scapes 2–3 in. long slender flaccid pale or whitish. Fl. rather large conspicuous deep full rich rose-purple or crimson (not pink or rose colour and veined as in *O. variabilis* BM. 1712) with the throat y.—A very beautiful but often troublesome pl.; never varying at all in Madeira from the above characters. This constancy is unfavourable to the views propounded in the Bot. Reg. 18. t. 1505, after Sir J. E. Smith, and to the fusion of the present pl. along with *O. speciosa* Jacq. Ox. t. 60 (*O. purpurea* L.) into *O. variabilis* Jacq. Ox. t. 53 (Bot. Reg. t. 1505; BM. 1712).

O. versicolor L. (BM. 155) occurs with 2 or 3 other sp. occasionally in gardens, which may perhaps in the course of a few years become also naturalized.

Order XIX. TROPÆOLACEÆ.

The Nasturtium or Indian-Cress Family.

Fl. perfect irregular. Sep. 5 coloured persistent $\frac{2}{3}$, spurred, slightly imbricate in the bud. Pet. 5 alternate with the sep.

unequal ⅔ often clawed sometimes abortive folded together and convolute in the bud. Stam. 8–10 free inserted on the recept. yet almost perigynous. Ov. mostly 3-celled 3-lobed rarely 2–5-celled 2–5-lobed; ovules 1 in each cell; style 1, stigmas 3 or 2. Fr. not bursting, spongy dry or baccate; carp. mostly 3 attached to the base of the style, 1-celled 1-seeded. Seeds large without albumen. Embr. large with thick finally conferruminate cot. eared at their base and a short radicle next the hilum.—Smooth trailing pl. with showy fl. and a pungent cress-like flavour, of a juicy tender substance and quickly withering. L. alternate without stipules. Fl.-st. axillary solitary.

††1. TROPÆOLUM. Cal. 5-partite, lobes equal, the upper spurred. Pet. 5 unequal, the 3 lower smaller or abortive. Stam. 8 wholly distinct or free. Fr. spongy or corky of 3 (by abortion 1 or 2) indehiscent 1-seeded kidney-shaped carp. ribbed and rounded at the back.

1. TROPÆOLUM L.

††1. T. MAJUS L. **Nasturtium.** *Chagas.*

L. peltate orbicular slightly 5–7–9-lobed or angular, the nerves not produced beyond the edge; pet. 5 obtuse.—BM. t. 23; Brot. ii. 15; DC. i. 683; Spr. ii. 226.—Herb. ann. or per. Mad. reg. 1, 2; ♀. PS. reg. 2; r. Waste ground and bramble hedges amongst gardens and vineyards about Funchal, and quite naturalized in the north along the sea-coast road between Ponta Delgada and S. Vicente, and at the latter place. PS. in a thicket by the half-built church of N. S. de Graça. April–Sept. but at almost all seasons.—Whole pl. smooth juicy and succulent with long trailing fleshy brittle st. L. glaucescent, throwing off water like drops of quicksilver. Fl. large orange more or less approaching to red, streaked with deep blood-red, and so together with their shape suggesting to Linnæus the name of Trophy-flower.

Order XX. RUTACEÆ.

The Rue Family.

Fl. perfect regular. Cal. 3–5-partite persistent imbricate in the bud. Pet. 4 or 5 alternate distinct with short claws inserted at the base of a short *gynophore* or glandular stalk or cup-shaped disk which is either free or united to the cal., twisted or twisted-imbricate in the bud. Stam. as many or 2 or 3 times as many as the pet., inserted with them, mostly hypogynous, sometimes perigynous. Ov. either stalked or sessile on the longer or shorter gynophore, deeply 2–5-lobed, 2–3–5-celled; ovules 2–4

rarely fewer in each cell; styles as many as the lobes or cells from their lower angles, separate downwards, united upwards; stigma simple 3–5-angular. Fr. a capsule with carp. more or less united bursting inwardly. Seeds few single or in pairs in each carp. with or without albumen; radicle superior.—Mostly strong-smelling pl. sprinkled with pellucid resinous dots or glands. L. without stipules often pellucid-dotted and compound. Fl. corymbose y. or w.

1. RUTA. Cal. 4-, rarely 3- or 5-partite. Pet. as many, clawed concave or spoon-shaped. Stam. twice as many. Nectariferous pores or glands on the gynophore as many as the stam. Ov. with as many lobes or grooves as the sep.—Strong-smelling glaucous pl. Fl. y. the central one generally pentamerous.

1. RUTA L.

Rue.

1. R. BRACTEOSA DC. **Rue.** *Arruda.*

St. flexuose leafy; l. nearly or quite sessile 2–3-pinnate 2–3 times as long as broad, in outline rather short broadly oblong or oval, the middle pinnæ being the longest; lfts. narrow oblong or elliptic obtuse, wedgeshaped downwards; branches of cyme and pedic. quite smooth; br. leafy rather large cordate or ovate; pet. fringed contracting abruptly into the claw; lobes of caps. remote acuminate.—DC. i. 710; Spr. ii. 320; Presl 215; RIB. 8. t. 780. f. 1063; RFG. 5. t. 157. f. 4815; Koch 159; WB. i. 13, 14; Seub. Fl. Az. 47. *R. graveolens* Buch! 196. no. 346; Holl's List (not Linn.). *R. angustifolia* Lowe in Hook. J. of Bot. i. 42 (not Pers.).—Suffr. per. Mad. reg. 1, cc; PS. reg. 3, r; GD. reg. 2, c. Sunny hill-sides and rocky places near the sea or with a maritime exposure general in Madeira, as at the Brazen Head, the Piedade and other parts of Ponta S. Lourenço. In PS. up Pico de Baxo and P. de Conselho sparingly. March-June.—A low shr. about 1 ft. high, glaucous or greyish very strongly fetid and intensely bitter. L. crowded upwards, with narrow spathulate or cuneate distinct lfts.; lowest pair of pinnæ stipulary or set close to the st. Fl. rather conspicuous greenish-y. Br. large compared with those of *R. angustifolia* Pers., to which I formerly referred this pl.

Order XXI. PITTOSPORACEÆ.

The Pitch-seed Family.

Fl. perfect regular. Sep. 5 or 4 deciduous imbricate in bud. Pet. 5 or 4 slightly clawed and cohering by the claws imbri-

cate in the bud. Stam. 5 distinct alternate. Ov. free 2–5-celled, cells with many ovules; style 1; stigmas 2–5. Fr. a capsule or berry, with 2–5 many-seeded cells and more or less complete dissepiments; dehiscence loculicidal. Seeds numerous, bathed in a viscid resinous juice. Embryo minute in a fleshy albumen; radicle long slender; cot. short indistinct.—Small mostly resinous tr. or shr. L. simple alternate coriaceous without stip. Fl. white or yellowish, rarely blue.

1. PITTOSPORUM. Sep. 5. Pet. 5, the claws cohering. Caps. 2–3-valved, 1-celled. Seeds enveloped in resinous gum.

1. PITTOSPORUM Sol.

1. P. CORIACEUM Ait. *Moquem*, or *Moquino*.

Arborescent; l. coriaceous obovate-oblong or spathulate mostly obtuse quite smooth and entire; fl. in terminal subumbellate racemes or racemose panicles; br. ped. pedic. and sep. rusty-pubescent.—Sol.! in Hort. Kew. ed. 1. iii. 488; Vahl Symb. ii. 43; Andr. Bot. Rep. t. 151; Lodd. Bot. Cab. t. 569; DC. i. 346; Spr. i. 791; WB. ii. 139, 140. — Arb. per. Mad. reg. 2, 3; rrr. High rocks and remote inaccessible cliffs in ravines in the north; Seisal, 1855, Sr J. M. Moniz, growing in large quantity at a place called *As Fôntes* and *Rib. das Fôntes*, 1857, Mr. N. H. Mason, who has also observed a single tree in Rib. da Metade and two in Rib. Frio on almost inaccessible rocks. Young pl. in the grounds of Jas. Bean, Esq. at Camacha are said to have come from the Serra of Porto da Cruz: other full-grown trees are in the Quinta da Cova at the Mount. May, June. —A small tree from 15 to 25 ft. high with a straight trunk 4–6 in. diam. or as thick as the arm or thigh and a close or bushy somewhat pyramidal or oblong head of very dark gr. not shining foliage. Bark light ash-colour smooth and even. Wood white and close-grained but of no particular use. Branchlets proliferous in terminal bunches or umbels stiff and strong naked downwards. L. collected thickly towards the ends of the branches stiff and rigid, dark gr. above, pale beneath; when young light gr. and furry or velvety-pubescent on their upper surface only with the petioles, both becoming presently quite smooth and shining; the nerves indistinct or inconspicuous; the margins thin pellucid quite entire slightly revolute at least in the dried pl., the l. otherwise, especially while young, rather peculiarly flat, in shape oblong attenuated downwards into the short flattened petiole subacute whilst young, afterwards more or less obtuse and spathulate 2–4 in. long and 1–2 in. broad. L.-buds short ovate imbricated with dark brown scales which are persistent at the base of the shoots for a year or

two. Fl. in several aggregate somewhat branched or compound mostly drooping or nodding rac. or racemose panicles, from large terminal imbricated buds, bell-shaped elegant and highly fragrant like a mixture of Orange and Barberry fl., cream-coloured or yellowish-white, smaller but somewhat like a bunch of snowdrops. Racemes short sometimes simple but mostly branched at the base and with several terminal fl. or umbellate, often slightly drooping sometimes erect, 1–2 in. long. Pedic. $\frac{1}{4}$ in. long bracteate both at the base and often higher up. Br. oblong membranous; those of the lower fl. reflexed green and leafy deciduous; of the upper smaller narrower or linear-oblong and more permanent. Rachis of rac. pedic. br. and cal. all more or less clothed or fringed with close ferruginous velvety pubescence. Sep. ovate-oblong rather obtuse not quite half the length of the tube-like straight part of the campanulate cor. Pet. nearly $\frac{1}{2}$ in. long of a thickish leathery substance slightly pubescent outside, their claw or lower half straight, limb obtuse recurved or curling back. Stam. not reaching beyond the throat; fil. thick smooth white; anth. erect oblong. Ov. oblong pubescent, attenuated upwards into the thickish style which is scarcely longer than the stam. and crowned by the abrupt subcapitate gr. stigmas.—From Quinta da Cova trees transplanted from their native rocks.—Caps. (from Masson's orig. Mad. spec. in BH.) large, $\frac{1}{2}$ in. long and nearly as broad, roundish-ovate or oval, apiculate with the short hardened base of the style, rusty-brown, curiously vermiculato-verruculate or sinuato-rugulose, only 2-valved in the specimen; but this is frequently the case by abortion in other species.

The Portuguese name *Moquino* is doubtless a mistake or misnomer for *Mocaã* or *Mocano*, which at Seisal is properly the name of *Visnea Mocanera* L. fil.—a discovery due to the accurately discriminating eye of S^{r} J. M. Moniz, who in the summer of 1856 first found and distinguished the last-named pl. growing on its native rocks at Seisal, from *Catha* or *Celastrus cassinoides* Herit., which it very much resembles: thus at once clearing away all confusion about two sorts of *Moquino* or *Mocano* in Madeira, of which I had some evidence, and making the interesting addition to the indigenous Madeiran Flora of another properly Canarian tree. On the other hand, it may be doubted whether *Pittosporum coriaceum* Ait. is really an indigenous Canarian pl., though described as such by Webb; M. Bourgeau, formerly Mr. Webb's Canarian collector, assuring me that he had not been able to discover it in any of the islands, though he had often searched in the exact spot in Teneriffe

indicated by Webb as that in which he had himself once only met with it. The description moreover in the *Phytographia Canariensis*, though in the main correct, is at variance in some few points with the true pl., and may have been therefore possibly drawn up from Madeiran specimens of the latter which were given to him by me in 1828, combined with something really different, though similar, gathered by himself afterwards in Teneriffe, perhaps in an imperfect state.

END OF PART I., THALAMIFLORÆ.

A MANUAL FLORA

OF

MADEIRA.

PART II.

Subclass II. CALYCIFLORÆ.

Stamens more or less united with the pet. to the sep., and inserted on the latter around or above the ovary (*i.e.* more or less perigynous).

Order XXII. CELASTRACEÆ.

The Spindle-tree Family.

Fl. regular. *Æstivation imbricate.* Sep. 4–5. Pet. 4–5 alternate with the sep. inserted on the edge of a fleshy hypogynous disk lining the base of the cal., rarely abortive. Stam. 4–5 *alternate with the pet. and opposite the sep.* inserted on the disk and subperigynous. Ov. free more or less immersed in and connected with the disk, 2–5-celled, cells 1–many-seeded; ovules erect. *Fr. either a 2–5-celled caps.* bursting loculicidally, *or a drupe. Seeds mostly arillate*; albumen fleshy; embryo straight axile; radicle short; cot. flat leafy.—Small tr. or shr. with alternate simple l. and small deciduous stip. Fl. inconspicuous small scentless.

Tribe *EUONYMEÆ.*

Fr. capsular bursting loculicidally.

1. Catha. Cal. small 5-toothed. Pet. 5. Stam. 5 inserted beneath the edge of a 5-crenate fleshy disk. Stigma 3-fid. Ovary adnate to the disk; ovules naked, at first exarillate. Caps. 3-celled. Seed naked; the aril (*arillode*) incomplete embracing its base only.

1. Catha Forsk.

1. C. Dryandri Lowe.

Without spines, wholly smooth, erect, thickly bushy and leafy; l. rather small, coriaceous, shining, ovate-oblong or elliptic, pointed or obtuse, irregularly obscurely and remotely

serrulate; pedunc. very short, mostly simple and 1-fl., aggregate on short axillary spurs.—*Celastrus umbellatus* Dryander! in BH.; Buch! 198. no. 424.—Shr. per. Mad. reg. 1; c. Rocks in ravines for about a mile from the sea. Sea-cliffs a little out of Funchal to the eastward along the Caniso road, and rocks at the edges of the first ravine. Up the Rib. de S^ta^ Luzia nearly to the origin of the Levada on the S. Roque side; and rocks on the W. side of the Palmeira, &c. In similar situations near Camera de Lobos, in the Soccorridos ravine, at Paul do Mar, &c.; and in the north at the Arco de S. Jorge, S. Vicente at the edge of the cliffs above the cemetery, and along the coast towards Seixal at the first waterfall, and again at the descent into the Rib. do Inferno. Dec., Jan.—A low bushy close-branched thickly leafy shrub, 3 or 4 ft. high, with strong stout st. and branches covered with a smooth brownish ash-coloured bark, the younger branches straight and reddish. Foliage evergreen, like that of a *Phillyrea*. L. shortly petioled, solitary and alternate only on the young shoots, clustered on the spurs and older branches from the development of numerous secondary leaf-buds; very variable in size and shape, 1–2 in. long and ½–1 in. broad, more or less lanceolate-oblong, often blunt or even spathulate, but mostly more or less attenuated at each end, very irregularly and sparingly serrulate, rarely entire. Inflorescence depauperately or abortively cymose. Fl. small, ⅕ in. diam., pale greenish-yellow, scentless, mostly solitary each on its own proper ped., produced abundantly on the short woody side-spurs from the axils of the leaves; each ped. from ¼ to ⅓ in. long, jointed halfway or more upwards, with from 1–3 minute discoloured bractlets below the joint, bearing very rarely more than one fl., but sometimes producing from the joint 3 or more, each on its own proper pedic. and so far approximating to the cymose inflorescence of the allied Tenerifan *C. cassinoides* (Hérit.). Sep. short ovate obtuse. Pet. ovate somewhat thick or fleshy, opening like a star. Stam. scarcely more than half the length of pet. Fil. somewhat crimson, all parts of the fl. having a tendency to become reddish. Ov. large. Style short. Stigma nearly sessile trifid crimson. Fr. growing very fast and soon acquiring its full size, but not ripening till May, large and conspicuous, ⅓–nearly ½ in. diam., pale yellowish, globose, subangular, 3-celled, mostly only 2-seeded, one cell being abortive, bursting wide open from the top halfway downwards before it fully ripens and disclosing the 3 large cells, with a single erect rather large oval shining light chestnut-brown seed in 2 of the 3 cells, each seed supported at the base, as in a little shallow cup, by the arillode, which is beautifully white, like spermaceti. As the fr. ripens the valves become strongly and stiffly reflexed, and so, by corrugation, closely and elegantly striated.

The Tenerifan *Celastrus* (*Catha*) *cassinoides* Herit. is a distinct sp. with more lax straggling branches, larger broader l. and cymose-panicled fl. Dryander long ago in his MS. in BH. had well distinguished the two, calling the Tenerife pl. *C. laxus*, and the Mad. *C. umbellatus*. But they were presently confounded by Héritier, from whom a letter to Dr. Dryander is still extant in BH. containing the words, "Votre *laxus* et *umbellatus* sont mon *cassinoides*." His diagnosis and figure have been taken, however, altogether from the Tenerifan *laxus*, with the exception of the inflorescence in the plate, which seems to have been added subsequently, in an evidently slovenly and careless manner, to accommodate his figure to his view of its identity with the smaller-leaved Mad. *umbellatus* of Dryander: his union of this latter to the Tenerifan pl. having been apparently an afterthought. At all events *C. cassinoides* Hérit. Sert. Angl. 6. t. 10 mainly belongs to the Tenerifan pl.; unfortunately superseding, by right of prior publication, Dryander's excellent MS. name of *laxus*.

To take up, however, Dryander's other MS. unpublished name of *umbellatus* for the Mad. pl. would be undesirable, the epithet being founded on an erroneous view of the inflorescence, and, in fact, rather applicable to the Tenerifan than to the Madeiran pl. The latter therefore requiring a new specific name, will most appropriately bear that of its exact and learned first discriminator, by whose acumen it was long ago ably distinguished from the Tenerifan pl. with which Héritier afterwards confounded it. And the two sp. will stand thus:

1. *C. cassinoides* Hérit.; fol. sparsis v. subterminalibus late ovalibus obtusis; fl. cymoso-paniculatis, cymis lateralibus axillaribus pedunculatis.—*Celastrus cassinoides* Hérit. Sert. Angl. 6. t. 10. *C. laxus* Dryander! MS. in BH.
   Hab. in Ins. Tenerifa, rr.
2. *C. Dryandri* Lowe; foliosa dumosa fol. anguste oblongis v. elliptico-ovatis; fl. aggregato-axillaribus, ped. unifloris raro 3-pauci-floris vix sc. abortive subcymosis.—*Celastrus umbellatus* Dryand.! MS. in BH.; Buch! 198. no. 424.
   Hab. in Mad. reg. 1.

Order XXIII. RHAMNACEÆ.

The Buckthorn Family.

Fl. regular. Sep. 5–4 deciduous, *valvate in æstivation*. Pet. 5–4 alternate with the sep. inserted in the throat of the cal.,

sometimes 0. Stam. 5–4 *opposite the pet. and alternate with the sep.*, inserted with the pet. Ov. free or adnate downwards with the cal., surrounded by a glandular disk, mostly 3-, rarely 2–4-celled; cells 1-seeded, ovules erect. *Fr. fleshy and berry-like* 2–4-celled and seeded, or dry and capsular splitting into three. Seeds solitary in each cell erect *without an aril*; albumen fleshy or 0; embryo straight long; radicle short; cot. flat. —Tr. or shr. often spiny, with alternate simple l. and small stip. Fl. greenish small scentless.

1. RHAMNUS. Cal. 4–5-cleft, its base persistent and adnate to the fr. Pet. inserted with the stam. on the edge of the cal.-tube. Fr. fleshy berry-like, 2–4-celled, 2–4-seeded.

1. RHAMNUS L.

Buckthorn.

* *Alaternus* Tournef., DC. Unarmed, branches alternate, *leaves evergreen coriaceous, style 2–3-fid.*

1. R. GLANDULOSA Ait. *Sanguinho.*

L. broadly oval or oblong-oval obtusely serrulate, the axils of the 2 or 3 lowest veins glandular-bullate or blistered; fl. hermaphrodite in short erect few-fld. axillary racemes; fr. smooth shining.—Ait. Hort. Kew. (ed. 1) 1. 265; Vent. Malm. t. 34; Buch 198. no. 423; DC. ii. 23; Spr. i. 769; WB. ! ii. 132. —Tr. per. Mad. reg. 2; rr. Rib. do Seixal, plentifully in the thicket on each side of the road nearly at the bottom of the Voltas or descent from the Cruzinhas to the Chaõ da Ribeira, a little before crossing the dry bed of the torrent: about the Furada along the Levada between the Lamaceiros and Rib. Frio. In gardens occasionally, at the Palmeira, the Mount, Camacha, &c. cult. Fl. March, April; fr. June.—A small tree 15–25 ft. high with a straight trunk 4 or 5 in. diam. covered with a greyish bark, with a pyramidal or bushy head of shining dark gr. foliage. Young shoots, leaves and petioles subpubescent. L. when adult smooth and shining, $1\frac{1}{2}$–3 in. long, 1–2 in. broad, obtuse or slightly pointed, always rounded at the base, shortly stalked, stiff and rigid, becoming often almost boatshaped with the edges strongly recurved, evenly and bluntly serrulate, with mostly 2 or 3 rarely 4 little wart-like blebs towards the base, convex above, opening beneath by a minute pit or pore and hairy within, one in each axil of the 2–4 lower nerves. Stip. narrow small deciduous. Fl. small, rather bright y.-gr., in short stiff bunches scarcely longer than the petioles in the axils of the upper l.; rachis and pedic. angular short and thick velvety-pubescent. Sep. and pet. rather thick

and leathery. Berries subternate globose $\frac{3}{8}$ in. diam. smooth shining purplish-black fleshy, of a fine sap-gr. within.

Condalia coriacea Reich. in Holl's List, omitting the synonyms, is assuredly *Heberdenia* or *Ardisia excelsa* Ait. The mistake doubtless arose from some imperfect spec. of the latter, communicated by myself to Herr Holl, and carelessly ticketed "*Rhamnus integrifolius* DC."

** *Frangula* Tournef., DC. Unarmed, branches alternate, *l. deciduous membranous* with straight oblique parallel nerves, *style undivided,* stigma capitate, seeds with a prominent scar.

2. R. LATIFOLIA Hérit. *Gingeira brava da Serra.*

L. broadly elliptic abruptly acuminate entire shining and nearly smooth, when young with their petioles the pedic. and cal. pubescent; fl. hermaphrodite, pedic. axillary aggregate subternate; fr. puberulous.—Hérit. Sert. Angl. 4. t. 8; Ait. Hort. Kew. (ed. 1) i. 265; DC. ii. 26; Spr. i. 768; BM. t. 2663; Seub. Fl. Az. 47.—Tr. per. Mad. but not found lately wild; reg. 2, cult. rr. In a few gardens; Quinta da Cova at the Mount with other rare unquestionably native trees, *e. g. Pittosporum coriaceum* Ait., *Rhamnus glandulosa* Ait., *Taxus baccata* L., *Juniperus Oxycedrus* L., *Ilex Perado* Ait., &c. May–July.—A low wide-spreading tree from 20 to 30 ft. high, with long straggling declining naked branches sparingly divided, leafy only towards their ends, which are thick, strong, rugged with the scars of the former l. and covered with dark reddish-brown bark. L. deciduous large 4–7 in. long, $2\frac{1}{2}$–$3\frac{1}{2}$ in. broad, for some time spreading, then stiffly and strongly reflexed, of a bright shining lively gr. turning red in decay, minutely pubescent at the edges and on the nerves beneath in all stages; when young rufous-downy all over like the rather long petioles; primary lateral nerves opposite, from 12–15 pairs, equidistant, regularly and exactly parallel. Petioles slender about an inch long. Stip. small linear-lanceolate pubescent, withering and dry or rigid, but neither spinous nor deciduous. Fl. small inconspicuous pale yellowish axillary 3–5 together; pedic. $\frac{1}{2}$ in. long and with the cal. downy. Upper side of petioles pedic. and cal. often bright red. Cal. 5-cleft about halfway down. Pet. small scale-like vaulted, pale y. like the inside of cal., each closing over an anther. Style short truncate and slightly bifid. Berries globose juicy $\frac{3}{8}$–$\frac{1}{2}$ in. diam. bright and shining but sprinkled with short y. hairs, passing from bright reddish-purple as they ripen into purplish-black; the lower ripening before the upper fl. expand; internally 2-celled, the cells hard separable but united by a fleshy partition. Each cell

contains a single oblong flattened seed staining the fingers with a y. juice, furnished with a remarkably turgid prominent scar or umbilicus.

No part of the pl. is spinous. The berries have a sweetish but nauseous slightly bitter taste without astringency.

In the island of Flores, one of the Azores, the tree is called Sanguinho d'Ovelha, or Sheep's Buckthorn, from the use of the l. at certain seasons of the year for fodder.

The discovery by Professor Heer of an undoubted leaf (as I consider it) of *R. latifolia* amongst the fossil plants of S. Jorge establishes the fact of this tree having been truly indigenous to Madeira; and though it is now seen only here and there in or about pleasure-grounds or gardens, I have warrant for believing it to have disappeared but very recently from the existing native Flora, if it be not indeed still actually lurking in some remote deep glen or on some inaccessible crag. In almost all the Azorian islands, according to Seubert, it is common, though in the form only of a "large shrub." Its introduction thence to Madeira is, however, an exceedingly improbable hypothesis, from the absence of all direct intercourse between the islands, and of any useful or ornamental properties in the tree itself. The Quinta da Cova tr. were believed by Mr. Wardrop, the late proprietor and original planter of the grounds, to have been brought to him some fifty years ago, with the other native tr. above enumerated, from the Serra by a countryman. It has, however, hitherto escaped the observation of all Madeiran botanists in its native haunts.

†Order XXIV. TEREBINTHACEÆ.

The Turpentine-tree Family.

Fl. regular often imperfect small mostly unisexual. Cal. small persistent 3–7- mostly 5-toothed. Pet. as many as sep. or 0, imbricated in bud. Stam. 3–5 or 6–10, rarely more, alternate with the pet., inserted on or outside the fleshy annular disk or torus which is sometimes inconspicuous. Ov. mostly single 1-celled free; ovule solitary. Styles 1–4 simple. Fr. mostly drupaceous indehiscent. Seed without albumen; radicle curved; cot. thick and fleshy or leafy.—Tr. or shr. with *resinous* often acrid and poisonous *juices*, and alternate often compound leaves *without dots or stip.* The Mango, Cashew-nut, Pistacia, Mastic, Japan and other Varnish-trees belong to this Family, of which no example is found in New Holland!

The fossil leaf-impression called by Prof. Heer *Pistacia Phœacum* Heer, can scarcely from its dotted surface have belonged to any Terebinthaceous pl.; nor do I see in what essential point it differs from the prints of leaves referred by him to *Myrtus communis* L.

†Tribe *SUMACHINEÆ.*

The Sumach Tribe.

Cot. leafy, radicle bent down upon their suture (*pleurorhizal*).

†1. RHUS. Fl. hermaphrodite, polygamous or dicecious. Cal. 5-cleft. Pet. 5. Stam. inserted outside the perigynous disk. Ov. 1-celled. Styles 3 short, or stigmas 3 sessile. Drupe dry 1-, rarely 2–3-seeded.

† 1. RHUS.

†1. R. CORIARIA, L. *Sumagre.*

L. pinnate with an odd terminal lft. hairy-pubescent; petiole simple slightly margined upwards; lfts. 5–7 pairs elliptic-oblong obtuse coarsely serrate.—Desf. i. 266; Brot. i. 475; Spr. i. 936; Buch 198. no. 420; DC. ii. 67; WB.! ii. 125.—Shr. per. Mad. reg. 1, 2; cc. Sunny, rocky or stony places by roadsides and in waste ground amongst cultivation, everywhere. Aut.—A low shr. with short stiff woody scarcely branched st. about a ft. high covered with a light ashy bark. L. 4 or 5 in. long; lfts. shining dark gr. above, villose and pale beneath. Panicle terminal thyrse-like. Fr. densely crowded dry hard villose blackish-purple. The pl. is used by the country people for tanning leather.

Order XXV. LEGUMINOSÆ.

The Pea and Bean Family.

Fl. *mostly perfect irregular,* sometimes imperfect, sometimes regular. Cal. inferior. Sep. 5 more or less combined, *the odd one outside or inferior.* Cor. *mostly papilionaceous,* sometimes regular, rarely 0; pet. 5–0 inserted into the base of cal. *mostly unequal or papilionaceous with the odd pet. (standard) inside or superior,* sometimes equal. Stam. mostly 10 perigynous rarely hypogynous, monadelphous or diadelphous (9|1), rarely tri-adelphous, sometimes distinct. Ov. superior *free* 1-*celled*; style and stigma simple from the upper or ventral seed-bearing suture of the mostly solitary 1-celled rarely 2–5-celled carpel. *Fr. a legume (pod)* or very rarely drupe. Embryo mostly without albumen or endosperm, rarely straight mostly curved and pleurorhizal or bent down upon the edge of the cot. which are

either fleshy or leafy, *aërial* (rising above ground), or *subterranean* (remaining underground) in germination.—L. alternate mostly compound, pinnate or ternate, with stip. general and partial. Pedic. mostly jointed on the ped.

SUBORDER I. PAPILIONACEÆ.

Fl. irregular *papilionaceous.* Pet. clawed imbricate in bud, *the upper one external, the 2 lower combined into a keel.* Stam. *perigynous* nearly equal, their *fil. variously combined.* Embryo *curved* pleurorhizal.

Tribe I. *GENISTEÆ.*

The Broom Tribe.

Stam. completely monadelphous. Ovules 2 or more. Fl. racemose (the rac. terminal or opposite the l.), or axillary.—Shr. or herb. erect not climbing or twisting. L. simple or digitate with 3 or more lfts., rarely pinnate. Cot. aërial leafy.

†††1. LUPINUS. Cal. deeply 2-lipped mostly 2-bractleted. Keel beaked acuminate. Sides of standard strongly reflexed. Anth. 5 *small precocious,* 5 *large oblong later-ripe.* Stigma bearded. Pod *large compressed coriaceous.*—Herb. or suffruticose. L. simple or *digitate* with 5–15 rarely 3 lfts. Stip. adnate to petiole. Fl. *in erect spikes or rac.* blue, w. or y. Cal. often with 2 caducous bractlets at the base. Cot. *thick fleshy.*

††2. ULEX. Cal. very deeply 2-lipped *almost 2-sepalous or bivalve,* always 2-bractleted at the base. Pod *small turgid* few-seeded.—*Shr. spinose apparently leafless; l. spinescent. Fl. axillary* y.

†3. SAROTHAMNUS. Cal. *indistinctly 2-lipped spathaceous or scarious at the edge.* Pet. *loose or spreading.* Stam. exserted. Style *long ascending* thickened upwards *channeled or flattened on the inner side. Stigma terminal capitate.* Pod flat. —*Shr. unarmed.* L. inconspicuous simple or ternate. Fl. *axillary* y.

4. GENISTA. *Cal. ⅔-lipped,* 3 lower sep. sometimes connate. *Style subulate ascending. Stigma sublateral inwardly, oblique.* Pod flat.—Shr. unarmed or spinose. L. simple or 3-foliate. Fl. *racemose* y.

5. ADENOCARPUS. Like *Genista* but pod and often cal. glandulose.—Shr. unarmed, *branches divaricate.* L. with 3 *mostly small lfts.* Fl. racemose y.

6. ONONIS. Cal. *campanulate 5-fid persistent* spreading in fr.

Keel *beaked acuminate.* Pod *short turgid.*—Suffr. or herb. more or less *glandular-pubescent.* Lfts. 3 *denticulate.* Fl. racemose or axillary, pink, w. or y.

7. ANTHYLLIS. Cal. *tubular inflated* 5-*toothed* or subbilabiate $\frac{2}{3}$, *persistent, bladdery in fr.* Keel *not beaked.* Pod *short rounded inclosed in the cal.*—Herb. or suffrut. L. *odd-pinnate.* Fl. y. w. or pink, racemose but *mostly congested into close crowded heads.*

Tribe II. *PSORALEÆ.*

The Psoralea Tribe.

Stam. *diadelphous* 9|1 or only halfway monadelphous. *Ovule single.*—Suffr. or herb. not climbing or twisting, *often warty-glandular and strong-scented.* L. various *always without stipels.* Fl. axillary solitary or densely racemose in heads, *bluish, w. or lilac.* Pod *short indehiscent* 1-*seeded.* Cot. aërial leafy.

8. PSORALEA. The only Madeiran genus. (Cal. 5-fid persistent, its tube villose or glandulose. Pod glandulose.)

Tribe III. *TRIFOLIEÆ.*

The Trefoil or Clover Tribe.

Stam. *diadelphous* 9|1. *Ovules* 2 *or more.*—Herb. St. not climbing or twisting. L. with 3 very rarely 5 lflts. *never stipelled*; *lfts. mostly denticulated by the numerous excurrent nerves.* Fl. in axillary or spuriously terminal *rac.* forming often short *compact heads,* purple, r., p., w. or rarely y. Cot. aërial leafy.

9. TRIFOLIUM. Cal. $\frac{2}{3}$-*toothed.* Pet. *slightly combined persistent withering.* Fil. somewhat dilated upwards. Pod *straight* small *mostly inclosed in the cal.* subindehiscent 1–4-seeded.—Fl. mostly numerous *in dense congested rac. or heads,* purple, r., p., w., or sometimes y.

10. MELILOTUS. Cal. 5-*toothed.* Pet. *distinct deciduous.* Pod *ovoid or globose* small but *not inclosed in the cal.* 1–2-seeded. *Seeds ovoid.*—Fl. *in long somewhat lax rac.* y. or rarely w.

11. MEDICAGO. Cal. 5-toothed. Pet. distinct *deciduous. Pod spirally curled,* rarely *falcate or reniform, large exserted from the cal. Seeds reniform.*

Tribe IV. *LOTEÆ.*

The Bird's-foot Trefoil Tribe.

Fl. umbellate mostly y. rarely p. or w. *Lfts.* 3 *entire, their nerves not excurrent.* The rest as in *Trifoliecæ.*

12. LOTUS. Cal. campanulate 5-*toothed.* Keel beaked acuminate. *Style simple* subulate. Pod straight linear spuriously lomentaceous or many-celled, many-seeded.—Herb. or suffr. Fl. y.

13. PEDROSIA. Cal. campanulate 5-*partite.* *Style bifid or toothed beneath.* The rest as in *Lotus.*

††† Tribe V. *GALEGEÆ.*

The Goat's-Rue Tribe.

Stam. 1-delphous or diadelphous. Ovules 2 or more. Pod mostly 2-valve. L. pinnate. Fl. racemose. Cot. aërial leafy.

††† 14. ROBINIA. Cal. short campanulate $\frac{2}{3}$-toothed. Standard rounded large reflexed. Stam. *diadelphous.* Pod flat *margined at the upper edge* bivalve.—Tr. or shr. with often prickly stip. L. odd-pinnate, lfts. stipellate. Fl. handsome w. or rose in drooping axillary rac.

Tribe VI. *HEDYSAREÆ.*

The Saintfoin Tribe.

Pod *jointed, separating* when ripe *transversely into* 1-*seeded indehiscent joints* or cells.—Cot. *aërial leafy.* Habit various. L. mostly odd-pinnate, sometimes 3-foliate, rarely simple. Fl. umbellate or racemose.

* Fl. umbellate. *L. odd-pinnate.*

15. ARTHROLOBIUM. Cal. tubular. Keel obtuse. *Pod curved very slender subcylindrical, joints scarcely contracted at each end.*—Herb. *smooth.* Fl. small y. in axillary stalked *bractless* umbels. (Belongs probably to *Loteæ.*)

16. ORNITHOPUS. Cal. tubular. Keel obtuse. *Pod compressed; joints equally contracted at each end.*—Herb. *pubescent.* Fl. small in axillary stalked umbels *bracteate* (with an odd-pinnate l.) *at top.*

17. HIPPOCREPIS. *Cal. campanulate. Keel beaked acuminate.* Pod compressed, *the upper suture excised-sinuate, the joints crescent- or horse-shoe-shaped.* Seeds *curved or crescent-shaped.*—Herb. Fl. y. in axillary stalked *bractless* umbels.

** Fl. umbellate. *L. simple.*

18. SCORPIURUS. Cal. campanulate. Keel beaked acuminate. Pod *spirally or circularly curled or revolute, longitudinally grooved,* 3-6-jointed.—Herb. Fl. y. in axillary stalked bractless umbels.

Tribe VII. *ASTRAGALEÆ.*

The Milk-Vetch Tribe.

Stam. diadelphous 9|1. Pod *more or less 2-celled longitudinally, continuous bivalve dehiscent.*—Herb. or suffr. L. *odd-pinnate.* Fl. mostly racemose or capitate. Cot. aërial leafy.

19. BISERRULA. Cal. 5-fid. Keel obtuse. *Pod 2-celled depressed flat, the valves compressed with a sinuate-toothed dorsal keel.*—Herb. Fl. in racemose heads.

20. ASTRAGALUS. Cal. 5-toothed. Keel obtuse. *Pod imperfectly 2-celled* by the inflexed margin of the lower barren suture, *the valves rounded and plain or even at the back.*—Herb. or suffr. Fl. racemose or capitate, rarely axillary.

Tribe VIII. *VICIEÆ.*

The Vetch Tribe.

Stam. halfway monadelphous or diadelphous 9|1. Pod 1-*celled continuous bivalve dehiscent.*—Herb. St. mostly climbing with leaf-tendrils. L. *even-pinnate* (except sometimes in *Cicer*), the petiole produced into a tendril, awn or point. Infl. axillary; fl. racemose or by abortion solitary. Cot. *thick fleshy, subterranean* except in *Faba. Primordial l. alternate.*

†††21. CICER. Style *smooth* filiform. *Pod inflated membranous 2-seeded.* Seeds globosely ovate *gibbous beaked or pearshaped.*—St. scarcely climbing. L. odd- or even-pinnate; lfts. *many serrate.* Fl. small w. grey or lilac.

22. ERVUM. Style filiform *hairy or pubescent upwards, not bearded. Pod short oblong* few-seeded. *Seeds globose.*—St. climbing with branched tendrils. Lfts. *many small entire.* Fl. *small inconspicuous* white, pale bluish-grey or lilac.

23. VICIA. Style filiform or subcompressed smooth or pubescent *bearded mostly on the under or outer side with a more or less distinct pencil or tuft of hairs below the tip. Pod linear-oblong.* Seeds several or many *subglobose*; *hilum lateral.—St. climbing with branched tendrils.* Lfts. *many,* rarely few, *rather small.* Fl. rather small conspicuous, often rose or purple, rarely v. or y.

24. FABA. Like *Vicia,* but *pod large coriaceous, somewhat inflated,* and spongy within. Seeds few compressed *oblong*; *hilum terminal*; *cot. aërial.—St. erect not climbing. Tendrils simple or* 0. *Lfts. few large.* Fl. greyish-w. and black. (Has some affinity with *Lupinus* in the pod and aërial cotyledons.)

25. LATHYRUS. *Style dilated* and *flattened upwards,* hairy or

pubescent *on the upper or inner side.*—St. climbing with branched tendrils *winged.* Lfts. *very few, rarely more than* 1 *or* 2 *pairs, elongate* and lanceolate, sometimes 0. Fl. *mostly large conspicuous,* often rose or purple.

††† Tribe IX. *PHASEOLEÆ.*

The Kidney-bean Tribe.

Stam. and pod as in *Vicieæ.* Stem mostly *twining often suffruticose. L. without tendrils* pinnate; *lfts. mostly* 3 *or* 1, *stipelled.* Infl. axillary rarely terminal; fl. normally racemose. Cot. thick fleshy *mostly aërial. Primordial l. opposite.*

†††26. PHASEOLUS. Cal. campanulate $\frac{2}{3}$-toothed, the upper teeth not longer than the lower. Keel *curled or twisted spirally.* Stigma *oblique or lateral.*—L. pinnately ternate, lfts. stipelled.

†††27. DOLICHOS. Cal. as in *Phaseolus.* Standard orbicular *with* 2 *protuberances or callosities at the base* within. Keel *not twisted.* Stigma *terminal capitate.* Pod with plain sutures.—L. as in *Phaseolus.*

†††28. LABLABIA. Same as *Dolichos,* but 2 upper teeth of cal. combined into one, and pod *roughly tubercled at the sutures.*

†† SUBORDER II. CÆSALPINIACEÆ.

Fl. irregular, *imperfectly or not papilionaceous.* Pet. imbricate in bud, *the upper one internal*; sometimes partially or wholly wanting. Stam. only *subperigynous,* often almost or quite hypogynous *distinct* unequal, *fil. all free.* Embryo *straight.*

†† Tribe X. *CASSIEÆ.*

The Senna Tribe.

Fl. *perfect subrosaceous* rather than papilionaceous, *pet.* 5 unequal spreading. Pod bivalve mostly indehiscent sometimes pulpy.—Shr. or tr. Fl. in panicled or simple rac. *conspicuous.*

††29. CÆSALPINIA. Sep. 5 *petal-like* unequal, the lowest largest concave or boatshaped, connate downwards into a cupshaped persistent base. Pet. *clawed,* the upper one smallest. Stam. 10 *all fertile,* fil. *villous-hairy.* Pod plain unarmed compressed dry bivalve.—Mostly *prickly climbing* shr. L. evenly 2-*pinnate.* Fl. y. scentless.

††30. CASSIA. Sep. 5 distinct unequal *deciduous.* Pet. *without claw.* Stam. 10 rarely 5 unequal, the upper shorter,

uppermost abortive; anth. *bursting at top* often by 2 pores. Pod *mostly indehiscent* often pulpy and many-celled within. —Shr. *unarmed not climbing.* L. *even-pinnate*; petioles mostly *with* 1 *or more glands*; lfts. opposite in pairs. Fl. y. scentless.

†† Tribe XI. *CERATONIEÆ.*

The Carob or Locust-tree Tribe.

Fl. *imperfect polygamous or diœcious. Sep. pet. and stam. irregular.* Pod indehiscent coriaceous mostly fleshy or pulpy within.—Tr. with abruptly pinnate l. Fl. racemose small inconspicuous. Pods generally large.

††31. CERATONIA. Cal. 5-*partite.* *Pet.* 0. Stam. mostly 5 *hypogynous.* Pod *thick* narrow linear many-seeded spuriously many-celled with fleshy or pulpy transverse partitions.—Tr. *unarmed.* Lfts. *coriaceous evergreen.*

†††32. GLEDITSCHIA. Sep. 3–5 equal, connate and *cupshaped at the base.* Pet. and stam. 3–5 *perigynous.* Pod indehiscent mostly pulpy within.—Tr. *mostly spinose.* L. *deciduous.* Fl. inconspicuous spicate gr.

†† SUBORDER III. MIMOSACEÆ.

Fl. *regular mostly polygamous* rarely all hermaphrodite. Sep. and pet. 4–5, *valvate in bud*, mostly more or less combined downwards. Stam. *hypogynous* definite or indefinite, free or monadelphous. Embryo *straight.*—L. even-pinnate or bipinnate. Fl. mostly in close heads or rac. Cot. leafy aërial.

††33. ACACIA. Fl. polygamous. Cal. 4–5-toothed. Pet. 4–5, free or combined into a 4–5-cleft cor. Stam. 10–200. Pod. continuous 1-celled *flat* 2-*valve dry dehiscent.* Seeds *without pulp.*

††34. VACHELLIA. Like *Acacia*, but pod *cylindrical or horn-shaped* turgid *indehiscent pulpy within*, and seeds in a double row.

SUBORDER I. PAPILIONACEÆ.

Tribe I. *Genisteæ.*

†††1. LUPINUS L.

†††1. L. TERMIS Forsk. **Lupine.** *Tremoço.*

St. proliferously branched upwards; lfts. obovate-oblong villose beneath; fl. pale blue bractleted alternate or scattered in short abrupt rac.; upper lip of cal. entire, lower slightly 3-toothed; seeds smooth and even, large flat nearly orbicular, uniform pale yellowish flesh- or cream-col.—"Forsk. Descr.

131;" DC. ii. 407; Spr. Syst. iii. 227. *L. prolifer* Desr. in Lam. Dict. iii. 622; Brot. ii. 132; Biv. Bernh. Cent. 1ma 55.—Herb. ann. Mad. cult. reg. 1, 2, ccc. Sown universally as a crop; in fields for seed and fodder, in vineyards chiefly for manure to the vines. March, April.—St. erect 1–2 ft. high, stout and stiff, not branched till it has produced its terminal erect short blunt or truncate rac. of pale or rather dull blue fl.; then proliferously branched, the side shoots producing each a terminal rac. often overtopping the first, but not usually branching again. Foliage dull or greyish gr. softly villose and peculiarly flaccid or fast withering when gathered. Fl. scentless middle-sized very pale bluish or lilac. Cal. with mostly a minute linear bractlet on each side at the notch between the upper and lower lip. Pod about 2 in. long, oblong, coarse and thick, velvety. Seeds large flat squarish-orbicular smooth and rather shining, pale flesh or cream-colour, about ½ in. (6–7 lines) diam. and 2 lines thick.

The seeds are used as an ingredient in Sopas. The whole pl. is cut or pulled green for fodder; and is often grown under the vines in order chiefly to be dug into the ground for their manure.

In the Canaries, especially in Grand Canary, the same sp., called *Chocho,* is even more extensively cult. than in Mad.; and the seeds, macerated for 24 hours in cold water, are much used for feeding cattle.

Intermediate between *L. albus* L. and *L. varius* L., and marked by Mr. Bentham in HH. as a var. of the former; but its proliferously branched and bushy habit with the short abrupt rac. of pale blue fl. constantly distinguish it. Webb unaccountably omits it altogether in his Canary Flora.

†††2. L. LUTEUS L. **Yellow Sweet-scented Lupine.**

St. branched upwards; lfts. lanceolate-oblong acute, all over softly pubescent; fl. y. bractleted in remotely whorled interrupted rac.; upper lip of cal. 2-partite, lower 3-toothed; seeds smooth and even, rather small flat squarish-orbicular white or cream-col. speckled with black.—BM. 140; Desf. ii. 153; Brot. ii. 134; DC. ii. 407; Spr. iii. 228; Fl. Gr. t. 686.—Herb. ann. Mad. cult. reg. 1 or lower part of 2; r. At the Boa Nova on the road from Funchal to the Palheiro, sown for fodder and seminaturalized in and about the garden and environs. Mar.–May.—Whole pl. softly pubescent with white silky hairs but scarcely grey or villose, about 2 ft. high sparingly and straggligly or loosely branched upwards. Fl. conspicuous bright full y. approaching to orange, filling the air in Mad. with their perfume, which resembles that of the Wallfl. (*Cheiranthus*

Cheiri L.), in remote whorls of mostly 4 or 5 together, forming an erect terminal drawn-out rac. 3–6 in. long. Upper lip of cal. cleft nearly or quite down to the base; lower somewhat indistinctly 3-toothleted; bractlets distinct linear half as long as sep. Pods flat pubescent about 2 in. long, ½ in. broad, 4- or 5-seeded, the seeds prominent, 3–4 lines diam., 2 thick.

††2. Ulex L.

Furze, Gorse, or Whin.

††1. U. europæus L. **Furze.** *Carqueja.*

Branches spines and l. while young pubescent; primary spines strong elongate angular grooved or striated minutely scabrous; l. narrow ensiform acuminate pungent convex beneath, flattened above; fl. lateral, br. broadly ovate, cal. adpressedly villose-pubescent, the teeth minute and mostly indistinct or obsolete; wings as long as standard longer than keel.—EB. t. 742; DC. ii. 144; Sm. E. Fl. iii. 265; WB.! ii. 30, 31; Koch i. 165; Bab. 72.—Shr. per. Mad., G. D. reg. 2, cc. Between the Palheiro and S. Antonio da Serra especially about Camacha; Serras of Porto da Cruz, Fayal, Sta Anna, S. Jorge, &c., very abundantly, and perfectly naturalized. Introd. by the late Conde de Carvalhal about 50 years ago, and in 1826 almost confined to the neighbourhood of the Palheiro and Camacha, though now (1860) overspreading the open mountain-pasture region throughout almost the whole island, and superseding completely in many places the common Broom (*Sarothamnus*). Jan.–May.—A low densely bushy and thorny apparently leafless shr. 2–6 ft. high, of a uniform dark green, with thickly interwoven striated branches and long spines. L. small inconspicuous persistent linear ensiform flattened or a little concave above, cuspidate presently becoming rigid and spine-like. Spines branched near the base or halfway up, not longer than the flowers. Cal. br. adpressed, as broad as or broader than ped., thickly pubescent, ovate or cordate, short obtuse with a distinct keel or midrib pale brown, not deciduous. Fl. large, fragrant like Apricots, bright golden-y., thickly clustered towards the ends of the branches on short closely pubescent pedic. from both the primary and secondary spines. Cal. and edge of keel densely pubescent or villose. Pod flat short broadly oblong villose 2–8-seeded (mostly 3–4 or 5–6), bursting elastically in the sunshine. Hairs of sep. mostly brown or tawny towards their tips. Though the number of seeds is so variable, the ovules are almost always 8 or 9.

Used as in England for clipped fences, and occasionally as brushwood for firing. *U. europæus* Brot. ii. 78 (the "Tojo" of Portugal), according to Webb l. c. and *Iter Hisp.* p. 48, is *U.*

australis Clem. (*U. provincialis* Lois.). The "Carqueja" of Portugal is the curious wing-stemmed *Genista tridentata* L.

†3. SAROTHAMNUS Wimm.

†1. S. SCOPARIUS (L.). **Common Broom.** *Giesta.*

Branches crowded fasciculate long gr. slender flexible strongly grooved and ribbed or angular; l. inconspicuous dark full gr.; lfts. small, the lower stalked ternate, upper simple sessile; fl. large 1 or 2 together at each axil towards the ends of the branches, forming long loose upright or slightly drooping leafy rac., distinctly stalked; pedic. rather long with 2 or 3 sessile simple lfts. at their base; keel strongly curved; style loosely circinate thickened or dilated below the tip, pubescent below the middle; pods loosely hairy at the edges.—*S. scoparius* Koch ed. 1. 155; Seub. Fl. Az. 48. no. 365; Bab. 73. *S. vulgaris* Wimm., Koch ed. 2. 166. *Spartium scoparium* L.; EB. t. 1339; Sm. E. Fl. iii. 261, 262; Buch! 197. no. 384. *Genista scoparia* Lam.; Hook. Fl. Scot. i. 211; Spr. iii. 221; Holl's List in J. of Bot. i. 20. *Cytisus scoparius* Link; DC. ii. 154.—Shr. per. Mad. reg. 2, 3, ccc; PS. r; GD. r. Mountains above 1000 ft. in Mad. everywhere forming extensive thickets sometimes higher than the head of a man on horseback, either alone or mixed with *Vaccinium*, Laurels, &c. In PS. about the half-built church of N. S. de Graça; in GD. at the head of the central valley. March–July.—A dark gr. apparently leafless shr. usually from 6 to 10 ft. high with long slender somewhat drooping strongly angular flexible tough smooth gr. branches and small inconspicuous l., the lower ternate, uppermost simple; lfts. obovate or lanceolate dark gr. pubescent. Fl. large and handsome golden-y. axillary at the sides of the branches below their ends, solitary or in pairs on stalks ¼–½ in. long; pet. diffuse with stam. and style exserted; the standard distinctly notched. Pods flat blackish-brown clothed with long loose hairs at the edges; bursting elastically with a crackling report in hot sunshine, the valves twisting spirally. Seeds dark olive shining. The whole pl. turns dark brown or black in drying.

Sown extensively in the mountains for the purpose of being either cut down for firing, or burnt on the spot, every 5–7 years, to fertilize the ground, and cause it to produce a single crop of corn or potatoes. The twigs and more slender branches are also used commonly as withs for binding bundles of faggots, brushwood, fern, &c.; and numbers of the country-people, especially young girls and children, within reach of Funchal, gain a scanty and hard-earned livelihood by bringing daily into town,

often from great distances, bundles of "Giesta" to be used for heating ovens, &c.

Doubtless originally introduced into Mad., though proved by an old spec. in the BH. to have been existing there nearly 100 years ago, and now diffused so extensively, both by culture and self-propagation, as to appear perfectly indigenous: flooding the mountain-sides for miles with seas of golden blossoms in the spring and early summer. It is remarkable that this well-known pl., though found in the Azores, as in Mad., has not occurred to either Webb or myself in any one of the Canary Islands. Nor is its presence in them positively proved by Von Buch's alleged smooth-podded state of it (*Sar. scoparius* var. *glabratus*=*Cytisus glabratus* Link, WB. ii. 59), "confined to one small spot at the aqueduct above Orotava" in Tenerife: this pl. being possibly something altogether different, perhaps *Sar. arboreus* (Desf.), and at all events merely of local or chance occurrence from temporary cultivation. Brotero also omits it altogether in his *Flora Lusit.* as indigenous to Portugal. It may therefore be presumed to have been introduced into Mad. from either England or Scotland.

The fine and delicate basket-work peculiar to Madeira is manufactured from the slender peeled twigs of the present pl.

Since writing the above, I have received from my zealous and able botanical friend S^r^ Moniz, examples of a very remarkable and I believe hitherto unnoticed var. *β, albiflora,* with pure w. fl. They were gathered by him in June last (1861) at the Rabaçal. Except in the col. of the fl., I can detect no difference whatever from the ordinary y.-fl. Mad. pl. It remains to be ascertained whether this singular albino var., which must have originated on the spot from the common y.-fl. sort, can be propagated regularly or otherwise by seed. In a former letter (Nov. 2, 1860) S^r^ Moniz speaks of it as having been described to him by its first observer, S^r^ Cunha, as a single pl.

4. GENISTA L.

§ Upper lip of cal. bipartite.—*Teline* Webb. *Genistæ Genuinæ* Koch.

* *Unarmed; l. all ternate.*

1. G. MADERENSIS Webb.

Unarmed dark gr. leafy; branches stout stiff and woody

straggling ascending ribbed rugged and knobbed upwards, the young flowering shoots with their petioles and rac. silky-villose or shaggy with soft brown or fulvous ascending hairs; knobs (*pulvini*) strong and prominent; l. all ternate and very distinctly stalked; stip. small distinct conspicuous ovate-acuminate persistent villose; lfts. oblong obovate or lanceolate acute very distinctly awned or mucronate adpressedly silky-pubescent, with their margin and the prominent strong midrib beneath, like the petioles and stip., silky-villose; rac. cymose-panicled terminal erect very short and abrupt or truncate rather few-fld. scarcely overtopping the l., leafy at the base; rachis pedic. br. and cal. fulvous-villose; lower lip of cal. indistinctly 3-cleft.—*Teline maderensis* WB.! ii. 37. *Genista canariensis* Buch! 197. no. 385 (not Linn.). *Cytisus candicans* Holl's List! J. of Bot. i. 21 (not Lam., Linn., &c.). *Genista candicans* Webb It. Hisp. 50 in part only (not Linn.).—Shr. per. Mad. reg. 3, c. Perpendicular shady sides of rocks and steep wooded banks in most of the principal ravines. Rib. Frio by the road a little beyond the cottages; along the Levada at the Lamaceiros, &c., June, July.—A rather tall robust and somewhat sparingly branched shr. or sometimes almost tr. 5–15 or 20 ft. high with stout ascending straggling thickish naked branches bushy and leafy only towards their ends and below the l. angular ribbed and knotty with sharp projecting knobs or spurs formed by the old prominent *pulvini* of the l. Stip. small 1–2 lines long narrow-ovate finely acuminate or linear-lanceolate becoming hardened and persistent with the enlarged woody *pulvini*. L. crowded; petioles as long as or longer than the lfts. which are often nearly or quite equal ¼–½ in. long and about half as broad, dark gr. and often nearly smooth or naked above, always acute with a strong prominent midrib beneath produced into a distinct projecting awn-like point. Fl.-branchlets short leafy, forming thick crowded cymose panicles at the ends of the branches. Rac. 6–12 fl., 1–4 in. long, short and as it were præmorse or abruptly truncate, not produced beyond the l. Fl. large and handsome conspicuous slightly fragrant bright y. Rachis, pedic., br. and cal. densely fulvous-villose. Br. distinct long linear, as long as cal.-tube. Upper lip of cal. cloven halfway down into 2 ovate-triangular divergent teeth; lower lip a little longer and narrower obscurely 3-cleft at the tip, the 3 divisions linear connivent or closely parallel, and sometimes partially or quite combined into one. Standard roundish smooth or only a little pubescent outside about the notch at top. Keel densely silky-pubescent. Wings quite smooth longer than the keel. Stigma oblique inwards. Pods short about an in. long 2–3 lines broad flat compressed subvillose 4–7-seeded, one or more seeds usually abortive and the pods irregular in shape. Seeds dark olive-black flattened shining.—Pubescence of the young or flowering shoots,

stip., petioles, rachis, pedic. and calyx becoming in summer almost woolly, long and brown or fulvous during inflorescence. At other seasons, and especially in winter, it is comparatively short and silvery-white.

A most beautiful shr., occasionally almost tr., when in fl. and covered with its copious bunches of conspicuous fragrant golden fl. collected into large thick masses of crowded cymose panicles all over the pl.

At the Passo d'Area between S. Vicente and P^ta^ Delgada occurs a form or var. of this sp. with larger lfts. and more slender acuminate or pyramidal 10–15-fld. rac. (like those of *G. Paivæ*) produced beyond the l.: and S^r^ Moniz has met with a similar still more developed state of this form up the Rib. Grande de S. Jorge near the fossil-leaf-bed, as well as in the Arco de S. Jorge and at S. Vicente. Both seem however to be mere modifications, from excess of shade or moisture, of the normal state, with which in other points they perfectly accord. In particular the lfts. are lanceolate acute and distinctly aristate-mucronate, the lower lip of cal. is more or less 3-cleft, and in a spec. from S^r^ Moniz of the Rib. de S. Jorge pl., though neither in the rest nor in my own from the Passo d'Area, the villosity of the rac. is distinctly though somewhat pale fulvescent.

2. G. Paivæ Lowe. *Piorno.*

Unarmed *silvery-greyish leafy*; branches *erect* stiff *virgate* strongly ribbed but not rugged or knobbed, those of the present year with the petioles and rac. hoary with very short close-pressed shining silky silvery-white pubescence; *knobs* (*pulvini*) *and stip. obsolete*, the latter very short *minute and inconspicuous*; l. all ternate distinctly stalked; lfts. shortly and broadly obovate bluntly *rounded or retuse* at top and *not at all or very indistinctly or minutely mucronulate*, clothed all over equally like the petioles and young branches with short close-pressed silky pubescence; rac. terminal erect *produced beyond the l. subelongate slender narrowly pyramidal* or oblong leafless 10–15-fld., in bud attenuate-acuminate, in fl. obtuse; rachis, pedic., cal., keel and pods hoary with very short close-pressed silky-white or grey pubescence; *lower lip of cal. quite entire.*—Shr. per. Mad. reg. 1, r; G. D. reg. 1, rr. Sea-cliffs at P^ta^ do Pargo, ascending from the beach, and at Fajãa d'Ovelha; also at E. side of G. D. April–June.—A bushy leafy shr. 3 or 4 ft. high, of a more or less hoary silvery colour, with close thick-set branches and small crowded l. upwards. Branches erect straight slender ribbed or striated and angular, but without the prominent knobs and indurated distinct

stip. of *G. maderensis*, and in all states at all seasons finely silvery-pubescent instead of occasionally being tawny-woolly. L. crowded their petioles rather shorter than the lfts. which are slightly unequal ¼–½ in. long and more than half as broad. Rac. produced distinctly beyond the l. 1–2 in. long narrow and slender, at first pointed or acuminate, but presently obtuse, with the fl. individually smaller and somewhat paler as well as more compact or oblong than in *G. maderensis* Webb, often distichous or secund. Cal. $\frac{2}{1}$ equally cleft but not quite halfway down into only 3 nearly equal equidistant triangular-ovate pointed teeth, the usual lower 3 being perfectly united or combined into a single one precisely similar to but slightly more acuminate or longer than the upper pair. Standard broadly rounded, as broad as long, altogether smooth. Wings as long as standard oblong wholly smooth. Keel finely silky all over, its exposed part oblong obtusely rounded at tip, very nearly as long as wings or standard. Style long slender subulate except quite at base, smooth ascending towards the end. Stigma minutely capitate slightly oblique. Pods (immature) densely silky compressed flat 4–6-seeded.

The simply 3-toothed cal. caused by the complete junction into one of the 3 usual divisions of the lower lip, at once distinguishes this *Genista* from *G. maderensis* (Webb), *G.* (*Teline*) *Spachiana* Webb! BM. t. 4195, and from a Canarian pl. collected by Bourgeau marked in HH. *G.* (*Teline*) *discolor* Webb MS.

So elegant and distinct a sp. is no more than a just tribute therefore in the Flora of Mad. to the distinguished zeal and energy displayed in behalf especially of Madeiran and Canarian botany by my excellent friend and correspondent the Barão do Castello de Paiva, to whose persevering ardour and discrimination I am indebted for at least two highly interesting recent additions, viz. *Scirpus maritimus* L. and the curious little *Soliva stolonifera* (Brot.), to the Mad. Flora.

** *Unarmed*; *l. all simple.*

3. G. VIRGATA (Ait.). *Piorno* or *Giesta de Piorno.*

Unarmed much branched more or less silky-pubescent and hoary; branches virgate fascicled or crowded slender elongated drooping or pendulous striated and angular; l. all simple sessile lanceolate or elliptic sometimes obovate, mucronulate silky-villose; stip. very minute or obsolete; fl. subcapitate in very short few-fld. erect terminal corymbose rac. or little heads; rachis pedic. cal. standard and keel silky-pubescent; pods hoary-pubescent.—DC. ii. 149. *Spartium virgatum* Ait.!

Hort. Kew. (ed. 2) iv. 255; Buch! 197. no. 383; BM. 2265; Spr. iii. 176.—Shr. per. Mad. reg. 2, 3; cc. Dry sunny rocks and cliffs everywhere chiefly from 1000–4000 ft. but descending as low as 200 or 300 ft. Neighbourhood of Funchal up the W. side of the Rib. de João Gomes, &c.; beyond Camera de Lobos by the road, and top of Cabo Giraõ. Very plentiful about the Pico Grande along the Caminho Central; sea-cliffs at P^{ta} do Pargo, &c. March–July.—A shr. from 6–8 ft. high with much the habit as to its modes of growth of Common Broom (*Sarothamnus scoparius* L.) *i. e.* apparently naked or with small inconspicuous l., but with more slender almost filiform crowded flexible drooping tufted switchy tresslike or brushlike branchlets and of a pale hoary or greyish silky lustre instead of dark dull gr. L. small very variable in size and shape, the upper simply acute or acuminate, the lower bluntly obovate and mucronate, the midrib inconspicuous and but slightly excurrent, 1–4 or 5 lin. long, ½–1½ lin. broad. Fl. slightly fragrant smaller less conspicuous and more lemon-y. at first than in *G. maderensis* Webb, afterwards more golden, and often turning rich orange-brown as they wither; aggregate in little heads of 2–4 together at the end of the branchlets and forming dense corymbose masses. Cal. silky-pubescent, 2 upper sep. triangular-ovate acute, 3 lower linear-lanceolate sometimes united into a single ovate one. Br. inconspicuous minute much shorter than cal.-tube linear silky-pubescent. Standard and keel silky-pubescent. Wings smooth. Stigma oblique inwards. Pods ½–scarcely 1 in. long, 2–3 lines broad, silky-hairy 3–5-seeded very flat acute or apiculate, often waved or sinuate at the margins, and strangulate or constricted between the prominent oval not much flattened shining black seeds, of which seldom more than 2 or 3 come to maturity.

The tough flexible branches and branchlets are used occasionally as withs for binding bundles, &c.

5. Adenocarpus DC.

1. A. divaricatus (Hérit.). *Codeço* or *Codeso*.

Branches pale or whitish divaricate stiff straight slender, tapering and puberulous upwards; l. fasciculate, dark gr., lfts. smooth and even above, puberulous and pitted or pustulose beneath, small mostly conduplicate; rac. terminal lax elongated, often compound or branched below and forming a loose pyramidal-oblong panicle; the lower fl. subremote, the upper crowded; pedic. longer than the very unequally 2-lipped tubercular-glandulose cal.—*Cytisus divaricatus* Hérit.! Stirp. 184; Ait.! Hort. Kew. (ed. 1) iii. 50 (not Sibth. Fl. Gr. t. 704). *C. parvifolius* Lam. Enc. Méth. ii. 248 (excl. syn.). "*C. complicatus* DC. Fl. Fr." (not Brot.). *C. glutinosus* Sol.! MSS.

in BH.; Buch! 197. no. 395. *Adenocarpus parvifolius* and *A. intermedius* DC. Prodr. ii. 158. *A. parvifolius* Spr. iii. 226; Holl's List! J. of Bot. i. 21. *A. complicatus* Gay!—Shr. per. Mad. reg. 2, r. Sunny hillsides about 2 miles out of Funchal up the Caminho do Meio both to the right and left of the road, abundantly, forming sometimes thickets. June–Dec.—A peculiar-looking shr. 2–5 ft. high with remarkably straight stiffly divaricate or erecto-patent interlacing taper branches of a singularly pale or whitish straw-colour, gr. only towards their tips whilst young, and in great part naked, with remote tufts or little crowded bundles of remarkably small dark gr. l. Branches stiff round slender tapering upwards, shining and smooth downwards, finely striate, minutely papillose and furry-puberulous upwards, especially whilst young; the side-shoots occasionally almost pungent or spinescent. L. aggregate in little distinct tufts on very short furry-pubescent petioles; lfts. 3 obovate-oblong or lanceolate, obtuse, 3–5 lines long and 1–3 broad, nearly or quite smooth above, furry-pubescent and scabrous beneath, almost always folded together lengthways and with the margins involute. Fl. bright lemon-y. scentless rather large and handsome, about the size of those of *Genista virgata* L., in terminal erect naked rac. at the ends of the main and short upper side-branchlets of the year, thus forming loose thyrsiform pyramidal or oblong panicles. Main rac. often branched or compound at the base; otherwise slender elongate 3–6 or 7 in. long with the lower fl. remote, the upper more crowded; side-rac. short 2–4- or 5-fld. Cal. strongly 2-lipped; lips very unequal, the 3 lower sep. pendent, ⅓rd longer than the 2 upper: the whole thickly tubercled or muricate like the pods with short obtuse subcapitate glandular setæ. Standard outwardly thickly pubescent or velvety; the rest of cor. smooth. Pods about an inch long, 2–2½ lines broad, compressed and flat, oblong, somewhat obtuse, all over hispid-muricate or papillose with short thick often capitate glands and slightly viscid; bursting elastically when ripe with considerable force in the hot sun, the valves twisting spirally in opposite directions. Seeds 5–10 very smooth and shining, at first dark greenish, then testaceous or reddish-brown mottled or speckled with black, flattened roundish-subtriangular or roundish-cordate, notched at the *hilum*.

In BH. there are 3 sheets of spec. belonging to this pl.: viz. 1, marked "*Cytisus glutinosus* MSS." with "*divaricatus*" written underneath, and at the back "Madera Fr. Masson 1776;" 2, "*Cytisus glutinosus* MSS." with "*C. divaricatus*" and "*Adenocarpus*" written underneath, and "Hort." at the back; 3, named as above, with "Herb. Miller" at the back. These 3 sheets therefore authenticate the syn. of Héritier and Aiton.

The single authentic original ex. in the Linn. Herb. of *Spartium complicatum* Linn.! Sp. Pl. (ed. 1) i. 709, though closely resembling in habit and foliage the present pl., has the cal. simply pubescent and not glandulose. To this, under the name of *Adenocarpus complicatus* (L.!), belong probably the following syn.: *Cytisus complicatus* Brot. ii. 92 (excl. syn. *Cyt. parvifolius* Lam.). *C. Hispanicus* Brot. ii. 91? (not Lam.). *C. divaricatus* β. "cal. pilosis nec glandulosis" BM. t. 1387. *Adenocarpus Telonensis* DC. Prodr. ii. 158. *Ad. complicatus*? Welwitsch! ex. desicc. Fl. Lusit. no. 781 in BH.

6. Ononis L.

Rest-harrow.

§ *Natrix* Moench. Fl. and pods distinctly stalked; the stalk jointed upwards.

1. O. reclinata L.

Herbaceous annual softly glandular-villose erect bushy, lower branches ascending; l. ternate, uppermost simple, lfts. obovate-wedgeshaped serrate above the middle; stip. oval or ovate toothed; fl. axillary drooping in short leafy at first corymbose rac.; ped. 1-fld. jointed upwards solitary erect simple not armed or aristate naked scarcely or but a little shorter than the l., as long as the fl. and pods; pedic. short abruptly hooked above its junction with the ped. naked or without bractlets at its base; cor. mostly longer than cal.; 4 upper sep. leafy often more or less dilated upwards, lowest simple linear-acuminate or subulate; pod drooping linear-oblong turgid subcylindric hairy rather longer than the cal. 12–20-seeded; seeds small orbicular-reniform compressed deep-black finely granulate or rough with excessively minute and close-set raised points.—Brot. ii. 97; DC. ii. 162? WB.! ii. 27.—Herb. ann. Mad. reg. 1, rr; PS. reg. 2, 4, r; ND. $\frac{r}{2}$; GD. reg. 2, r; SD. reg. 2, r. March–July.—Whole pl. softly hairy and glandular-pubescent, sometimes but not often viscid, light-gr. 4–8 in. high. St. short perfectly round and slender always erect, the lower side-branches spreading or reclining, their ends ascending. L.-stalks $\frac{1}{4}$–$\frac{1}{2}$ in. long; lfts. 3–5 lines long, 2–3 lines wide, rounded at the top, finely and distinctly serrulate above the middle, wedge-shaped and entire below. Fl. rather large and conspicuous, at first few and scattered, ultimately in lax short leafy rac.; ped. erect 3 or 4 lines long 1-fld., the pedic. abruptly bent down close above its junction with the ped., which is without either awn or bractlets at top. Standard always more or less deep rose-colour, wings and keel pale or whitish tipped with rose. Pod

4–5 or 6 lines long and 1–1½ broad, densely pilose, pale brown or yellowish tipped with the long waved capillary style, scarcely or only a little longer than the persistent somewhat enlarged and spreading cal. Seeds 1¼ mill. in diam. roundish-reniform flat or compressed deeply and distinctly notched with the radicle very prominent; uniform plain black and elegantly and minutely granulate.—Var.:

α. tridentata Lowe (1838) Novit. p. 26 or 548; 4 upper sep. dilated upwards, mostly 3-toothed.—Subv. 1. Fl. rose-col. *O. dentata* Sol.! MSS. Prim. (Cam. Phil. Tr. iv.) 34. t. 4. *O. reclinata α. Lowei* WB.! (1840) l. c. 28.—Abundant at top of the Ilheo da Cevada or dos Embarcadores on P^ta^ S. Lourenço, Mad. Dry waste places by the road-side at Càmaxa and rocky summits of Pico do Castello and P. d'Anna Ferreira in Porto S^to^.—ND. along the central rocky crest or ridge. GD. on tops of the highest peaks towards the south.—Subv. 2. Fl. pure white. GD. rr. on tops of highest peaks with subv. 1.

β. simplex Lowe Novit. l. c.; sep. all simple entire linear-lanceolate acute or acuminate.—*O. reclinata* EBS. t. 2838; Hook. Brit. Fl. ed. 5. i. 76; Koch ed. 2. 174; Bab. 73. *O. Cherleri* Desf. ii. 148; Fl. Gr. t. 677; DC. ii. 162; Koch "ed. 1. 159" (not Linn.). *O. pendula* Desf. ii. 147. t. 191? DC. ii. 162? *O. mollis* Lag., Savi," DC. ii. 162. *O. reclinata β. Linnæi* and *γ. Fontanesii* WB. l. c. 28.—Mad. reg. 1, rrr. On P^ta^ S. Lourenço beyond the Rocha Furada, Dr. C. Lemann. ND. rr. growing intermixed with *α*. SD. at top, rr.

No dependence can be placed on the difference in the sep. of *α* and *β*, which vary through innumerable intermediate gradations from the dilated normally 3-toothed state to simple linear acuminate; *α* being however both in Mad. and the Canaries by far the most abundant form.

O. pendula Desf. seems from his fig. and description to be only a large luxuriant state of this pl. with smooth lfts. grown in a damp rich soil or situation.

§§ *Bugrana* DC. Fl. and pods nearly or quite sessile; the stalk not jointed.

2. O. MICRANTHA Lowe.

Herbaceous annual glandular-pubescent more or less viscid leafy; st. numerous procumbent or ascending; l. ternate, only a few of the uppermost simple; lfts. subcoriaceous nerved short broadly obovate or oval, closely evenly and sharply serrate; stip. large leafy ovate broadly amplexicaul more or less serrulate; fl. solitary erect subsessile in long leafy spikes, inconspicuous shorter than the l., cor. not longer than sep.; cal. campanulate

large leafy spreading and dilated after fl., equally 5-partite, the divisions linear-acuminate entire; pod erect turgid oval short compressed 2-seeded half the length of the enlarged cal.; seeds globular or ovoid strongly granulated marbled black and tawny-rufous.—Lowe Nov. p. 25 or 547. *O. villosissima* Desf. ii. 147, t. 192?, DC. ii. 163? *O. Dehnhardtii* Ten. Fl. Nap. iv. 110?—Herb. ann. Mad. reg. 1, r; PS. reg. 1, 3, r; ND. rrr. Brazen Head; P^ta^ S. Lourenço about the Piedade, and on the summit of the Ilheo dos Embarcadores. April, May.—St. stoutish or robust very numerous 6–12 in. long cespitose branching from the crown of the long tough simple slender whitish root, and spreading all round in a flat thickly leafy tuft. Lfts. dark yellowish-gr. rather large 3–9 lines long, 2–5 broad, sometimes oblong-oval not twice as long as broad, firm subcoriaceous or stiffish, strongly many-ribbed or nerved, regularly sharply and finely toothed all round quite or nearly to the base; the teeth 8–12 on each side the midrib, strong sharply produced acuminate formed by the numerous strong excurrent nerves. Fl. small dull purple produced singly from each axil throughout nearly the whole length of the branches, the lower shortly pedicelled, upper quite sessile. Cal. large and leafy especially in seed, open bell-shaped with a very short tube and 5 equal ensiform or lanceolate-acuminate spreading or erecto-patent strongly 1-ribbed divisions, the 4 upper straight or subascendent approximate or laterally imbricate, the lower one remote and subdeclining or deflexed. Standard pale purple pubescent outside longer than the paler wings which are equal to the keel; the latter white tipped with purple. Pods light yellowish-brown very short and abrupt, 2 or 3 lines long and about half as broad. Seeds nearly or quite 2 mill. in diam. mottled or streaked with black on a pale-y. or chestnut ground, considerably larger and somewhat less finely or closely granulated than in *O. reclinata* L., subglobose very slightly or not at all compressed and not at all reniform, the radicle not being at all prominent.—In spec. gathered before the seeds were ripe, the latter are decidedly compressed and orbicular. Hence the term "compresso-rotundatis" in Novit. 547.

Two forms or var. may be distinguished:

a. densely viscose-pubescent; st. procumbent or prostrate; lfts. short broadly oval or obovate, 3–6 lines × 2–4; stip. sometimes indistinctly toothed.—Mad. rrr. Caniçal about the Piedade; P^to^ S^to^, cc.

β. smoother more robust or succulent and erect, st. ascending or decumbent; lfts. oblong-oval 3–9 lines × 2–5; stip. distinctly toothed.—Mad. r. Brazen Head, P^ta^ S. Lourenço on the Ilheo dos Embarcadores.—A mere luxuriant form of *a*, due to soil and situation.

The somewhat stout robust leafy habit, large leafy stem-clasping subserrulate stip., short broadly obovate or oval evenly and closely many-serrate subcoriaceous lfts., large leafy campanulate calyxes much dilated after flowering with broader leafy sep. often twice the length of the ripe pod., and especially the larger more strongly granulated streaked or mottled black and rufous-tawny seeds distinguish amply the present pl. from the true *O. serrata* Forsk. !, Webb !, &c., which I have gathered in the Canaries, and which is of an altogether more delicate habit, especially in st. and foliage, with smaller thin and membranous or flaccid narrow linear-oblong remotely deeply coarsely and irregularly toothed or cut lfts., 3 or 4 times as long as broad, with not more than 5 or 6 teeth, instead of 9 or 10, on each side the midrib, small inconspicuous entire stip., smaller scarcely leafy or dilated calyxes, with sep. scarcely longer than the pod, and plain tawny-y. much more finely granulated globose seeds little more than half the size of those of *O. micrantha*. The latter pl. occurs at Gibraltar and on the island at Mogadore (var. β.); but I never met with it in the Canaries, where it is replaced by the true *O. serrata* Forsk.

O. parviflora Brot. is a perfectly distinct y.-fl. sp.

O. diffusa Ten. differs in too many points to be safely identified with the present pl. Moris (Fl. Sard.) quotes it however along with *O. Dehnhardtii* Ten. under *O. serrata* Forsk., adding also *O. litoralis* Spr. Syst. (Curæ Post.) iv. 2. 346.

Webb seems only to have known the true *O. serrata* Forsk.; and he also appends to it as syn. both *O. Dehnhardtii* and *diffusa* Ten., and *O. litoralis* Spr.

3. O. MITISSIMA L. *Trevo branco.*

Herbaceous annual; st. erect pale or whitish more or less hairy or woolly; l. ternate, lfts. oval obovate or oblong sharply serrate; stip. half-oval entire; fl. in hard close terminal ovate or ellipsoidal elongated leafy heads or spikes variegated gr. and w. by the prominent acuminate or cuspidate fringed sep. and enlarged hardened scariose whitish imbricated br. or 1–3-leaved stip. of the upper l. closely embracing and concealing the cal.-tube.—Brot. ii. 97; DC. ii. 163; Spr. iii. 179; WB. ! ii. 29.—Herb. ann. Mad. reg. 1, $\frac{c}{v}$; PS. reg. 2, 3, 4, ccc. ND. $\frac{r}{v}$; GD. ccc; SD. 0. Dry barren hillsides and borders of cornfields to the E. of Funchal along the Caniço road about S. Gonçalo, the Neves, Caniço, Machico, &c.; in PS. and the GD. everywhere. April-June.—A much larger and stouter pl. than either of the

preceding. St. erect much branched from the base, 1–3 ft. high straight and stiff with many long weak wide-spreading lower side-branches at the base, of a peculiar white or pale-y. colour. Foliage dark gr. harsh, not viscid, scentless. Fl. sessile inconspicuous nearly concealed by the fl. l. and their white hardened chaffy scale-like close-pressed dilated stip.; cal. tubular; cor. pale purple scarcely longer than the sep. which are equal lanceolate-cuspidate fringed many-nerved or striate gr. leafy with a pale or whitish scarious base and tube. Pods light brown sessile erect small flat broadly ovate or oval with a very abruptly hooked short beak or point, pubescent upwards, 2–3 lines long, 1½–2 broad, not longer than and quite concealed by the broadly ovate cuspidate leafy many-nerved sep. Seeds 3 or 4 rather small (1½ millim. diam.) dark brown or black flat or compressed orbicular indistinctly notched, with a slightly prominent radicle coiled round a central hollow on each side; strongly muriculato-granulate.

7. Anthyllis L.

1. A. Lemanniana Lowe.

St. suffrutescent downwards, diffuse or decumbent, clothed with close-pressed silky hairs; l. pinnate with an odd one, lfts. about 10 elliptic-oblong silky-hairy beneath unequal, the lowest smaller, the end odd one not larger than the middle lfts.; heads of fl. mostly double or in pairs bracteate, br. ligulate; cal. very hairy a little inflated oblong pale primrose or lemon-y., cor. cream-col. more or less tinged with pale rose or flesh-col. turning lemon-y. in drying, with the tip dark blackish crimson or atropurpureous; pod semi-oval 1-seeded.—Hook. J. of Bot. viii. 291.—Herb. or $\frac{\text{Shr.}}{2}$ per. Mad. reg. 3, 4, rr. Highest central rocky crags and peaks of the island, scarcely or only accidentally below 5000 ft.; Serra d'Agoa along the Caminho Central under Pico Grande, Webb, 1828; rocky peaks towards the Curral das Freiras, about the Pico do Areeiro, C. Lemann, 1837; a little way down the Voltas descending into the Curral das Freiras; Rib. da Metade, high up in the bed of the ravine, numerous fine pl. in fl., May 1857, Mr. N. H. Mason: but in both these two last localities it is merely an accidental straggler from the central heights above, *i. e.* the peaks about the Icehouse or Pico do Areeiro. I have myself observed it for several successive years flowering in all these localities except the last of all. May–July.—About a foot high branched forming a low bush or tuft of a rather pale greyish green scarcely hoary: st. slender suffrutescent at the base. L. 2–4 in. long; lfts. elliptic acute 3–7 lines long 1½–3 lines broad, above smooth full gr. silvery-hairy only at the edge, beneath silky-hairy scarcely silvery. Fl. in close heads on long slender erect or ascending ped. rather

small but very elegant, scentless, at first cream-col. faintly tinged with a pink or rose blush and tipped with dark crimson, the cal. pale primrose; in withering the narrow standard and wings become also pale primrose, and the tip of the keel turns atro-purpureous or black. Heads generally geminate, the lower nearly sessile, the upper stalked.

The large heads of cream-col. or pale blush-pink crimson-tipped fl., turning as they wither into a delicate pale primrose or lemon-y., render this a very well-marked sp., although in other respects it has very much the habit of the common Europ. *A. Vulneraria* L. I still possess an excellent flowering spec. collected in the Serra d'Agoa in 1828 by my late friend Webb under the name of "*A. montana* L.?" But Dr. Lemann first furnished me with *living* spec., although in too advanced a state of fl. for description, from the Icehouse Peak, in July 1837. It is however perfectly distinct as a sp. from either *A. montana* L. or the Spanish (not Canarian) *A. Webbiana* Hook. (BM. t. 3284); differing at first sight particularly from the latter in its truly suffrutescent habit.

Tribe II. *Psoraleæ.*

8. PSORALEA L.

1. P. BITUMINOSA L. *Fedegosa.*

Suffrutescent bituminous; l. pinnately ternate, *lfts. ovate-lanceolate or lanceolate entire* nearly or quite smooth, sometimes adpressedly pubescent chiefly beneath and at the edges, petioles and ped. closely and adpressedly pubescent; fl. in *abrupt short crowded spikes or heads*; sep. *acuminate-awned.*—Desf. ii. 191; Brot. ii. 100; Buch! 197. no. 400; Fl. Gr. t. 738; DC. ii. 219. *P. bituminosa a, communis* WB.! ii. 92.—Shr. per. Mad. reg. 1, 2, ccc. PS. reg. 1, rr. In Mad. everywhere on dry rocks and banks; in PS. only near the SW. point. Throughout the year.—A small sparingly branched shr. usually 1–2 ft. high with somewhat stout and straggling firm or woody elongated branches leafy upwards. L. on rather long sometimes nearly smooth stalks. Lfts. dark gr. somewhat shining 1–1½ in. long, those of the lower l. rounded-oval broader and shorter, of the upper oblong-lanceolate narrower and longer. Fl. in dense heads or clusters on long slender axillary ped. 2–4 times longer than the l., pale greyish bl. or lilac, rather handsome. Ped. upwards, br. and nerves of cal. very dark blackish gr. Cal. shaggy with grey and black bristly hairs; sep. acuminate-subulate or produced into long awn-like points. Pod flat inde-

hiscent about half an inch long, the lower 1-seeded part not longer than the cal.-tube turgid tightly coating the seed, shaggy with erect grey and black bristles and dotted with black glands; the upper barren part or beak protruding $\frac{1}{4}$–$\frac{1}{2}$ in. long slender acuminate very flat and thin straight and ensiform or slightly falcate naked pubescent at the edges, very pale brown. Seed single large ovoid compressed black shining closely adherent to the pod; *hilum* nearly equidistant from each end.

The whole pl. smells strongly of naphtha or bitumen.

†2. P. AMERICANA L.

Suffrutescent bituminous; l. pinnately ternate, *lfts. rhomboidal or roundish-ovate repand-toothed,* wedge-shaped and entire towards the base, nearly smooth *glandular-dotted*; petioles and ped. *glandulose* and more or less pubescent; fl. in *pyramidal or oblong-pointed* somewhat short and interrupted spikes or racemes; *sep. simply acute.*—Linn. "sp. 1075;" Spr. iii. 200. *P. dentata* DC. ii. 221.

β. cal. glandular and shaggy-villose. DC. *l. c. P. americana* Buch! 197. no. 401. *P. dentata,* Holl's List! in J. of Bot. i. 20.—$\frac{\text{Shr.}}{2}$, per. Mad. reg. 1, r. Borders of cornfields and amongst corn in all the district between the Ribeiro Seco to the W. of Funchal and the Praia Formosa below 500 ft.; not seen elsewhere, and evidently merely naturalized. Throughout the year, but chiefly March–June.—Rootstock per. sending out every year numerous ann. though somewhat shrubby stiff and woody stout diffusely spreading or procumbent branches 1–2 ft. long, which are gr. striated and thickly sprinkled with y. or brown pellucid wart-like glands intermixed with a few hairs. Foliage rather large, dark shining gr. with a rank bituminous smell. Petioles long. Middle lft. stalked, larger than the other two which are about an inch in diam. Fl. rather small, spicate on long axillary ped., pale lilac. Spikes or rac. at length 2 or 3 in. long interrupted below, dense upwards. Br. ovate-lanceolate shorter than the striated glandulose and densely villose cal. Sep. linear-oblong simply acute. Pod without beak 1-seeded indehiscent closely coating the seed altogether enclosed in the cal. shorter than the sep., 2 lines long, $1\frac{1}{2}$ broad, flat broadly oval densely muricato-glandulose or granulose, otherwise smooth, dark tawny-brown. Seed closely adherent to the pod oval flattened smooth tawny or yellowish-brown. *Hilum* nearer one end than the other.

Tribe III. *Trifolieæ.*

9. TRIFOLIUM L.

Clover, Trefoil. Port. *Trevo.*

Sect. I. *Lagopoda* L. (*Lagopus, Phleastrum, Eutriphyllum* Ser. inDC.); throat of cal. in fr. not inflated, hairy, often closed with a pair of lip-like prominences or a raised hairy ring within.—Herbage hairy. Fl. without bractlets. Pod 1–2-seeded.

* *Lagopus* Ser. in DC. Fl. in elongated spikes or rac.

1. T. ANGUSTIFOLIUM L.

Silky-villose hoary; st. erect branched only at the base; lfts. narrow linear-lanceolate acuminate ciliate*; spikes hairy *narrow-pyramidal or oblong-conical pointed* stalked or leafless at the base solitary terminal *harsh and rigid after fl.*; cal. 10-ribbed *glandular* and villose-hairy, teeth setaceous or subulate *scarcely longer than the cor., strongly nerved rigid subspinescent spreading and elongated after fl.*, the lowest longer than the 4 others.—Desf. ii. 198; Brot. ii. 106; Buch! 197. no. 406; Fl. Gr. t. 749; DC. ii. 189; Spr. iii. 212; WB.! ii. 69; Seub. Fl. Azor. 49. no. 370; Koch 187.—Herb. ann. Mad. reg. 1, cc. PS. reg. 2, 3, cc. ND. r/2. GD. reg. 2, ccc. Mad. to the W. and E. of Funchal near the sea everywhere; about Machico, the Piedade on P^ta^ S. Lourenço, &c.; PS. along the N. coast at and beyond Camacha by roadsides in grassy spots, &c. March–May.—The largest except *T. pratense* L. of the Mad. Trefoils. St. several from the crown of the root, 6–12 in. high, erect straight simple. Whole pl. greyish, clothed with long white silky hairs. Lfts. ½–1½ in. long, ½–2 lines broad, much longer than the leafstalk. Stip. long and narrow acuminate or taper-pointed. Heads at first ovate, then elongate pyramidal acuminate, 1–3 in. long; fl. not large but rather deep rose-col. *Throat of cal. closed after fl. by 2 opposite internal lip-like prominences*, the teeth spreading, rather hard and pungent, copiously clothed like the 10-ribbed tube with long white silky hairs. Pods 1-seeded; seed ovoid, slightly compressed smooth bright y.; radicle not prominent.

2. T. ARVENSE L. **Hare's-foot Trefoil.**

Softly hairy hoary-grey; st. erect mostly branched from the base and bushy; lfts. linear-oblong or -obovate, retuse and mucronulate or slightly toothed at top; spikes *oval then oblong*

* With a superabundance of marked specific differences it does not seem worth while to overload the diagnoses of *Trifolium* with the less discriminative characters of the stipules.

or subcylindric obtuse, sometimes ovate, close *very soft and grey or whitish-villose* stalked solitary axillary and terminal; cal. very hairy, teeth setaceous or subulate *feathery-ciliate nerveless longer than the cor.,* nearly equal, a little spreading but *soft and otherwise unchanged after fl.*—Desf. ii. 198; Brot. ii. 106; EB. t. 944; H. Fl. Sc. i. 218; Sm. E. Fl. iii. 305, var. *a*; DC. ii. 190, var. *a*; Spr. iii. 213; WB.! ii. 72; Koch 188, var. *a*.—Herb. ann. Mad. reg. 1, c. PS. reg. 2, rrr. Waste rocky ground and beds of ravines here and there sparingly, about Funchal, Paul do Mar, S. Vicente, &c. March–June.—Generally from 3 to 6 in. high, mostly branched, often bushy, and always upright in Mad.; branches forked slender filiform, the main stem sometimes flexuose. Root small. Foliage grey, small and scanty; l. subsessile; upper lfts. long and narrow about half an inch long and 1–2 lines wide, lower shorter and broader. Stip. long and narrow acuminate or taper-pointed nerved and membranous. Heads purplish-grey or hoary ½–¾ inch long and ⅓–½ in. broad always obtuse, occasionally shortly ovate. Fl. very pale rose minute and inconspicuous concealed by the elegantly plumose or densely fringed reddish or purplish cal.-teeth which remain soft or flexible after fl. Throat of cal. simple but hairy. Seeds smooth "oval greenish-y., radicle not prominent" (Bab.).—A small rather inconspicuous pl. of short duration and scant foliage; but remarkable for its bushy upright habit and for the shape and peculiar softness and hoariness in all stages of the heads or spikes, from whence it has its English name.

** Fl. in short ovate oval or globose heads or umbels. (*Phleastrum* and *Eutriphyllum* Ser. in DC.)

3. T. LIGUSTICUM Balb.

Hairy-pubescent dull smoky-gr.; st. erect, branches elongate diffuse procumbent or ascending; lfts. obovate retuse and subdenticulate at top; heads *oblong or ovate-oblong hairy stalked* sometimes geminate; cal.-tube 10-*ribbed hairy,* teeth *setaceous or awn-like subulate much longer than the cor.* equal *pilose soft and unchanged after fl.*—DC. ii. 191; WB.! ii. 72; Seub. Fl. Azor. 49. no. 371. *T. arrectisetum* Brot. Phyt. Lusit. i. 152. t. 63. f. 1. "*T. aristatum* Link" (DC. and WB.).—Herb. ann. Mad. reg. 3 (1 and 2 occasionally), c. GD. reg. 2, cc. Dry rocky banks and mountain pastures in the Serra d'Agoa, the Rabaçal, Rib. de S^{ta} Luzia, &c.; Curral das Freiras (E. side) (Dr. Lemann); up the Caminho do Meio near Funchal; at the Mount (S^{r} Moniz); sea-cliffs! S. Vicente. GD. on tops of all the peaks and high rocky ridges abundant. June, July.—A small inconspicuous pl. of short duration, growing singly or detached here and there, softly hairy of a dull rather dark gr. Main st. erect, branches few or distant spreading from 2 or 3 to

8 or 10 in. long slender but firm dull violet or purple, the ends ascending. Lfts. softly hairy on both sides dull or dark smoky-gr. immaculate from $\frac{1}{4}$ to $\frac{1}{2}$ in. long and half as broad, minutely toothed. Stip. broad at the base narrow upwards and produced into a long acuminate point nerved membranous. Heads on long or short ped. sometimes sessile with one or two l. at their base about 6 lines long and 3 or 4 lines broad sometimes in pairs of a dark dull greyish gr. tinged with purple, bristly with the long hairlike cal.-teeth but soft. Cal. unchanged after fl. except in becoming more hairy; tube pale gr. strongly 10-nerved its throat closed with a raised dark-gr. internal hairy rim or border; teeth twice the length of the tube spreading setaceous a little dilated at the base purplish or dark dull gr. not becoming rigid, the lowest scarcely longer than the rest. Cor. very small pale-pink or rose. Pod obovate 1-seeded. Seed obovate smooth y.; radicle prominent on one side.

This sp. often has the heads of fl. so distinctly oblong that it might well be placed in the preceding group * but for its close affinity in other points with the next succeeding sp.

4. T. LAPPACEUM L.

Foliage hairy-pubescent dark dull blackish gr.; st. erect with numerous cespitose elongated diffuse or prostrate side-branches from its base; lfts. villose-hairy obovate minutely subdenticulate at top; heads *hirsute hairy-webbed subglobose subsessile* solitary terminal *harsh rigid and spinescent after fl.*; cal.-tube 20-*ribbed smooth*, teeth *triangular and 3-ribbed at the base* produced into long bristly awns or subulate points *fringed with long spreading hairs* nearly or quite equal erect 2 or 3 times longer than the cal.-tube and *a little exceeding the cor., after fl. spreading enlarged rigid somewhat horny and spinose.*—Brot. ii. 104 (excl. var. Conimbric.); Spr. iii. 214; DC. ii. 191; Fl. Gr. t. 746; Moris Sard. i. 482. t. 62. f. 1; Seub. Fl. Azor. 49. no. 372; WB.! ii. 71; Koch 188.—Herb. ann. Mad. reg. 1, r. ND. $\frac{1}{2}$. Fields or waste fallow ground near the fort at the E. end of the Praia, and a little out of Funchal to the E. along the Caniço road. ND. near the ruined house. March–June.—St., sheath of stip. and cal.-tube nearly or quite smooth; lfts., free point of stip. and cal.-teeth softly hairy; petioles sprinkled more or less with hairs. Foliage a peculiar dark lurid or smoky blackish-gr. Main stem erect not above 5 or 6 in. high; side-branches prostrate or ascending, often a foot long or more, spreading widely all round on the ground, mostly straight and simple. Lfts. rather small and short, softly and copiously hairy, stip. long and narrow acuminate taper-pointed ribbed or striate. Heads rather large and nearly globose. Fl. white with a faint pink blush. Cal.-teeth after fl. hard and almost pungent, triangular

and very strongly 3- or 5-ribbed at the base, their long setaceous points fringed or clothed with long distinct spreading interlacing hairs: throat open but thickly fulvous-hairy. Pods always 1-seeded. Seed roundish-oval with the radicle a little protuberant on one side, yellowish-brown or tawny-y.

5. T. MARITIMUM Huds.

Whole pl. somewhat hairy dark full gr.; st. branched throughout diffuse or procumbent; lfts. oblong-obovate nearly or quite entire; *uppermost l. opposite in pairs*; heads *naked slightly pubescent half-ovate shortly-stalked* terminal, *harsh rigid and spinescent after fl.*; cal.-tube 10-ribbed *obconic, swollen tumid and subpubescent upwards*, teeth more hairy *shortly ciliate unequal shorter than the cor.* erect subulate, after fl. *spreading substellate broad leaflike triangular acute spinescent*, the lowest one longest 3-*nerved deflexed*, the rest 1-nerved.—EB. t. 220; Sm. E. Fl. iii. 303; DC. ii. 192; Koch 187. *T. irregulare* "Pourr.," Spr. iii. 215.—Herb. ann. Mad. reg. 1, rrr. PS. reg. 3, r. About the rocks a little above the "Crater" between the Gorgulho and E. end of the Praia, sparingly and in one spot only; first found in 1837 by Dr. Lemann. In PS. plentifully on steep grassy slopes near the top of Pico do Facho on the E. side, from ¼ to ½ a mile below the rocky summit; also at the Fonte das Pômbas on the N. coast near the Ninho do Guincho. April, May.—Whole pl. more or less but not copiously hairy-pubescent, rather dark but bright full gr. with a somewhat rank coarse succulent habit when luxuriant. St. diffusely spreading nearly erect 6–12 in. long. Lfts. narrow and oblong, often an inch long, hairy on both sides, scarcely toothed; the lower broader and short, on slender stalks. L. alternate; but a little below the head there is always a pair of opposite more shortly stalked l., characteristic of the sp., though obtaining also in *T. squarrosum* L. St. and stip. mostly hairy throughout. Stip. long and narrow membranous and nerved at the base, produced into long gr. herbaceous points. Heads rather large in fruit, naked or inconspicuously pubescent. Cor. pale-pink or rose, longer than the cal.-teeth, mostly deciduous. Tube of cal. pale, only slightly pubescent upwards, 10-striate but not quite to the top, the throat closed by 2 opposite lateral lip-like protuberances; teeth short more copiously though still shortly ciliate-pubescent, after fl. much enlarged leafy at their base, dark gr. contrasting with the pale tube and throat, stellate somewhat like the cal. of *Lotus major* Sm.; the whole resembling the head of a *Dipsacus* in miniature.

Very distinct from any other Mad. sp. by its dark full gr. herbage, succulent often rank coarse habit, large oblong lfts., opposite uppermost l., and foliaceo-stellate cal. It comes un-

doubtedly very near *T. squarrosum* L. which I have gathered in Grand Canary; but it is perfectly distinct.

†††6. T. PRATENSE L. **Common Clover.**

More or less pubescent scarcely hairy, dull gr.; st. erect branched succulent; lfts. large entire oval or oblong-oval, the upper elliptic-lanceolate; heads *large globose or ovate obtuse densely fld. sessile mostly bracteated at the base by a pair of floral leaves*; cal. 10-nerved hairy, teeth *soft setaceous ciliate unequal*, the lowest one much longer than the rest, but *not half the length of the tubular monopetalous cor.*; all nearly erect in fr.—Desf. ii. 194; Brot. ii. 105; H. Fl. Sc. i. 218; EB. t. 1770; Sm. E. Fl. iii. 302; DC. ii. 195 (var. *a*); Koch 184; Bab. 75.—Herb. per. Mad. reg. 1, semicult., rrr. Grass-plots at the Quinta do Valle, introd. originally from England with grass-seeds many years ago, and now perfectly established, yet not apparently self-propagating or spreading. June.—St. 10 to 18 in. high, erect or spreading. Stip. broad ovate nerved with an abrupt subulate or awn-like point. Heads large subelongate or spicate bracteated by the large dilated stip. of a pair of l. at their base, mostly solitary and sessile rarely geminate or stalked. Throat of cal. with a raised hairy ring inside. Fl. conspicuous fragrant bright rose-purple of varying intensity, quite overtopping and hiding the cal.-teeth which remain unchanged after fl. soft or flexible.

Occasionally cultivated, like common Lucerne (*Medicago sativa* L.), about English houses as an artificial grass or fodder for cattle.

7. T. STRIATUM L.

Hairy-pubescent *hoary*; st. somewhat erect or spreading and procumbent; lfts. obovate or obovate-oblong minutely denticulate at top; heads ovate or oval, oblong in fr., dense solitary sessile terminal and lateral, *sheathed or bracteated at the base by the broad dilated stip. of the uppermost l.*, in fr. *botryoidal*; cal.-tube 10-ribbed *ventricose very hairy*, teeth *nearly smooth* subulate awn-like or setaceous straight unequal *about as long as the cor.*; tube *in fr. oval-globose or urceolate*, teeth *slightly rigid*.—Brot. ii. 107; H. Fl. Sc. i. 219; EB. t. 1843; Sm. E. Fl. iii. 307; Buch! 198. no. 409; DC. ii. 192; Spr. iii. 216; WB.! 73; Koch 188; Bab. 76, 77.—Herb. ann. Mad. reg. 1, 2, ccc. PS. reg. 4, r. Has not occurred in any of the Desertas! Rocky sunny places in Mad. everywhere below 1500 ft. In PS. observed only at the S. base of the rocky summit of Pico do Facho. March–May.—Whole pl. *softly downy and hairy, greyish*. St. mostly more or less erect, 3–9 in. long, at least ultimately hard and stiffish. Lower lfts. short and broad, upper narrower and lanceolate sometimes acute,

their teeth very small and scarcely visible without a lens, often entire; veins equal and straight throughout *i. e.* not arched at the margins. Stip. ovate setaceo-acuminate, broad membranous and nerved at the base especially the uppermost. Heads mostly quite sessile, and even when terminal or when shortly peduncled accompanied by one or more l., the broad dilated ovate stip. of which closely embrace them. Cor. pale rose permanent. Cal.-teeth erect or slightly spreading very narrow acuminate, after fl. subulate straight and parallel, somewhat stiff but scarcely pungent. Tube strongly nerved turgid contracted at top and bottom densely hairy; throat open but a little contracted and hairy; the teeth nearly smooth or with only a few scattered hairs. After fl. characterized by the pale or whitish heads and remarkably turgid urceolate berry-like cal. with straight erect or very slightly spreading awn-like stiffish teeth. The cor. never drops, but remains in a brown withered state, concealing the throat of the cal. to the last. Pods 1-seeded. Seeds globose-ovoid turgid y. pale; rad. not prominent.

8. T. SCABRUM L.

Hairy-pubescent dull hoary gr.; st. procumbent flexuose; lfts. obovate or obcordate denticulate, *their veins thickened and curved at the margins*; heads rather small ovate sessile bracteate at the base solitary lateral and terminal, in fr. more oblong *hard and prickly*; cal. 10-ribbed hairy, teeth rather large and conspicuous *acuminate-cuspidate* as long as or longer than cor., *the midrib excurrent very strong and prominent,* in fr. *widely spreading or recurved very hard and prickly* with the tube cylindric.—Desf. ii. 199; Brot. ii. 107; H. Fl. Sc. i. 219; EB. t. 903; Sm. E. Fl. iii. 306; DC. ii. 192; Spr. iii. 217; WB.! ii. 74; Seub. Fl. Azor. 49. no. 373; Koch 189; Bab. 77.—Herb. ann. Mad. reg. 1, cc. PS. reg. 2, 3, 4, ccc. ND. $\frac{r}{2}$; GD. reg. 2, rr; SD. reg. 2, rr.—Rocky dry sunny waste ground near the sea general; along the Caniço road a little out of Funchal; P^{ta} S. Lourenço about the Piedade, &c., plentifully. In PS. hillsides everywhere up to the highest peaks. March–June.—An inconspicuous insignificant little pl. with rather dark dull greyish herbage and *strong stiff woody* often purplish-brown st. from 3 to 6 or 8 in. long, which are sometimes erect, and *mostly flexuose or zigzag.* Lfts. dark dull gr. pale-spotted *somewhat harsh or coriaceous.* Stip. small ovate abruptly pointed or acuminate nerved submembranous. Whole pl. hairy or downy, but remarkably harsh and stiff, the heads particularly after fl. becoming very rigid and almost prickly. Fl. small inconspicuous white. Cal.-tube pale, the throat closed by 2 callous lips, teeth gr. sharp hard and stiff. Pods 1-seeded; seed ovate oblong tawny-y.; radicle not prominent.

9. T. CHERLERI L.

Softly villose dull dark hoary gr.; st. procumbent *subcespitose*; lfts. obcordate or obovate minutely denticulate; heads *hemispherical softly and densely villose* solitary terminal sessile *sheathed at the base with three large rounded bract-like stip. forming a sort of cup-like involucre*; cal.-tube and teeth *silky-villose*, the latter *finely setaceous* straight equal *very villose, soft or flexible*, as long as or a little longer than the cor., after fl. elongated otherwise unchanged.—Desf. ii. 197; Brot. ii. 104; Buch! 197. no. 405; DC. ii. 196; Spr. iii. 216; Fl. Gr. t. 745; Moris Fl. Sard. i. 480. t. 61; WB. ii. 70; Koch 188.—Herb. ann. Mad. reg. i. (upper part), r. In rocky or stony barren ground to the E. of Funchal a little beyond the chapel at the top of the hill on the Caniço road; and hills immediately above the Brazen Head, abundant. April, May.—A small rather inconspicuous pl. with subcespitose st. not above 6 or 8 in. long, all over densely clothed with whitish hairs. Lfts. rather small and foliage altogether scanty. Veins of lfts. straight and simple. Stip. broadly ovate pale or whitish membranous with dark nerves; their short subulate tip herbaceous gr. and more or less recurved. Heads large hoary densely villose soft in all stages, semiglobose and somewhat flattened at top, seated in and closely embraced by a curious sort of shallow cup (like that of *Euphorbia segetalis* L.) formed by the 2 rounded enlarged pale or whitish green-edged gr.-nerved and gr.-tipped or mucronate stip. of the single fl. leaf and a 3rd internal br. or half-stip. without any l. opposite the other two. Fl. white with a faint blush or pink tinge sometimes in the bud, about the length of the straight setaceous densely villose cal.-teeth. Cal.-tube pale obscurely 20-veined or striate not turgid, clothed like its teeth with long silky hairs; throat open but densely villose. Pods 1-seeded rather large turgid. Seed oval plump rufescent.

T. sphærocephalon Desf. ii. 201. t. 209. f. 2 is probably, as remarked by Webb, a mere form of the present pl. with rather longer sepals than usual.

10. T. STELLATUM L. **Starry Trefoil.**

Softly villose hoary; st. diffuse or decumbent *loose and straggling*; lfts. obcordate wedge-shaped or subtriangular slightly denticulate at top; heads *densely villose globose somewhat few-fld. lax stalked* solitary terminal; fl. pedicelled; throat of cal. closed with hairs, teeth *linear-lanceolate somewhat broad or leafy 3-nerved and reticulated at the base* finely acuminate erect straight equal scarcely longer than the cor., after fl. *long spreading stellate soft or flexible densely villose*.—Desf. ii. 199; Brot. ii. 107; Buch! 197. no. 407; EB. t. 1545; Sm. E. Fl. iii. 304; Fl. Gr. t. 750; DC. ii. 197; Spr. iii. 213; WB.! ii. 70; Koch 187; Bab.

76.—Herb. ann. Mad. reg. 1, $\frac{c}{2}$. Dry sunny hills to the E. of Funchal, as between the Caniço and Camacha roads about a mile out; at the fossil-bed and hills near the Piedade and about the whole of P^{ta} S. Lourenço, general. March–May.—Greyish, clothed in all parts with copious long soft white hairs. St. 4–6 in. long weak and loosely spreading. Foliage scanty; lfts. not large on long leafstalks. Stip. large broadly ovate or oval short apiculate and slightly toothed membranous with gr. nerves hairy. Heads large on rather long naked stalks loosely declining with less crowded somewhat fewer fl. which are more distinctly stalked than usual. Cor. pale rose (cream-coloured, Bab.) small yet as long as or very little shorter than the long slender cal.-teeth. Cal.-tube 10-ribbed villose; the teeth after fl. much and remarkably enlarged conspicuous and elegant star-like with the long rays fringed copiously with long white hairs, its throat or centre of a rich dark reddish-purple, in the midst of which is a prominent compressed tuft of densely interwoven white woolly hairs completely closing the mouth of the tube. This white tuft or eye relieved by the dark purple or red ground gives a very peculiar flower-like appearance to the head in fr. Pods 1-seeded. Seed "elongate-ovate reddish chestnut" (Webb).

II. *Trichocephalum* Koch; throat of cal. not inflated, open simple naked and not hairy within.—Herbage hairy. Fl. without bractlets; fertile few (1–5), sterile or abortive upper forming a terminal deflexed *coma*. Pod 1-seeded splitting the distended membranous cal.-tube.

11. T. SUBTERRANEUM L.

Softly hairy-pubescent pale bright gr.; st. prostrate or procumbent; lfts. obcordate nearly entire; heads few (2–5)-fl. lax stalked axillary lateral, *after fl. deflexed and rooting*; fl. stalked slender elongate deflexed after fl., the lower fertile with long filiform hairy nearly equal cal.-teeth shorter than the cor., the tube smooth, inflated and splitting longitudinally in fr.; *the upper fl. abortive, presently becoming rigid 5-pointed stellate crowning the heads with a deflexed coma*, and fixing or burying them in the soil.—Desf. ii. 196; Brot. ii. 103; EB. t. 1048; Sm. E. Fl. iii. 300; DC. ii. 202; Spr. iii. 218; WB.! ii. 76; Hook. Fl. Br. (ed. 5) i. 79; Koch 189; Bab. 77.—Herb. ann. Mad. reg. 1, 2, $\frac{r}{2}$. Chestnut woods and mountain pastures at and above the Mount; Camacha about the church and on the Achada, &c.; Machico, reg. 1, 2, abundant. March–June.—Whole pl. clothed with soft white close not very long hairs; st. numerous branched 3–12 in. long, running amongst grass close to the ground, and fixing themselves in it by means of the deflexed axillary ped. Lf.-stalks rather long. Lfts. large bright but rather pale gr. with a pale transverse irregular band below the middle, mostly entire or

very obscurely denticulate at top. Stip. broad ovate large and conspicuous, their filmy white or pale lower half streaked longitudinally with dark purple, the upper half gr. herbaceous. Fl. 2–5, in oblong or obversely pyramidal heads, remarkably long and slender; cor. rather large much exceeding the cal. white *i. e.* very pale lemon or cream-colour, sometimes tinged with very pale rose, the standard faintly streaked with pale pink or purple. Tube of cal. long slender smooth pale lemon-gr. below, bright reddish or purple upwards, the red in streaks or close-set striæ; the long hairy softly setaceous or filiform teeth bright gr., nearly equal, and as long as the tube; the throat open naked. Fl. at first close and erect, but soon spreading and deflexed, discovering in their centre a small conical knob composed of close-pressed fleshy gr. points (abortive fl.). These when the ped. become deflexed in fr., become themselves deflexed and starry at the tips, increasing in size and rigidity, forming a kind of white fleshy *coma* closely embracing the fr. of the lower (now uppermost) fertile fl., which they finally bury and root firmly in the soil $\frac{1}{2}$ an in. or more beneath the surface, when the whole head assumes a globose shape. By the time this rooting *coma* has forced itself down into and taken firm hold of the soil, the seeds of the originally lower (now uppermost) 3 or 4 fertile fl. are found ripe, one large orbicular dark brown or black and shining in each smooth compressed orbicular pod, which is coated by the now inflated cal.-tube splitting longitudinally, and all closely embraced by the stiff fleshy white root-like transformed abortive fl. forming the *coma*.

III. *Vesicaria* L. (*Vesicastrum* Ser. in DC.); throat or upper lip of cal. after fl. inflated vaulted and bladdery, simple and naked within.—Herbage nearly or quite smooth. Fl. bractleted, the lowest bractlets forming an involucre.

12. T. FRAGIFERUM L. **Strawberry Trefoil.**

Nearly smooth *cespitose* full gr.; st. *creeping stoloniferous*; lfts. obovate or obcordate closely and elegantly nervoso-striate finely and sharply serrulate; ped. axillary *considerably longer than the l.*; heads in fl. *large* hemispherical, *bractlets of lowest ring of fl. forming a distinct many-cleft involucre equalling the cal. of lowest fl.*; *fl. all nearly or quite sessile*; heads in fr. *large compactly globose velvety*, upper part of cal. inflated *globose bullate* scarious *reticulated velvety all over*, the 2 upper teeth setaceous equal *subinconspicuous* shorter than the *prominent conspicuous permanent cor.*—EB. t. 1050 (bad); Brot. ii. 109; H. Fl. Sc. i. 219; Sm. E. Fl. iii. 308; DC. ii. 202; Spr. iii. 217; Koch 189; Bab. 78.—Herb. per. Mad. reg. 1, cc. Dry sunny slopes near the sea; P^ta^ S. Lourenço, at the bottom of Labra crossing over to the N. side in the narrowest part, and at the Piedade below the fossil-bed

in the turf above the sandy beach; Machico, Rib. do Seixo, S^ta^ Cruz, Porto Novo, Caniço and Cabo Garajaõ, in sunny waste ground, roads and paths most abund.; also at P^to^ da Cruz in the north. May–Sept.—Plant gregarious cespitose with stoloniferous shoots forming perennial beds or patches. Habit or foliage most like that of *T. repens* L. but smaller. Root strong tough thick and woody, long and tapering, striking down deep into the soil. St. 3–12 in. long creeping interlacing and running partly under ground, throwing out at frequent intervals strong tough and fibrous roots, and thus forming large perennial beds or patches. Herbage bright full gr. nearly smooth; st. stip. and upper surface of lfts. quite smooth; ped. petioles and midrib beneath especially of young l. a little hairy. Petioles distinct slender filiform often elongate. Lfts. small stiffish unspotted, elegantly striate especially beneath with numerous straight regular close-set parallel forked nerves, more distinct or thickened towards the margins. Stip. ovate acuminate or lanceolate finely pointed whitish with gr. nerves. Ped. 3–4 in. long curved ascending. Heads large hemispherical in fl., globose in fr., with a large distinct multifid involucre formed of the confluent linear-lanceolate bractlets of the lowest ring of fl. which are as long as their calyxes. Fl. rose, much longer than the cal.-teeth. Standard broad flat truncate or very obtuse streaked with very fine deeper pink lines; wings short, keel still shorter. Heads in fr. nearly or quite half an in. in diam. compactly and neatly globose, the inflated cal. being close-packed and half immersed like the grains (drupes) of a raspberry or blackberry, acquiring usually a pink or rosy, sometimes blood-red or crimson tinge, resembling Hautboy strawberries, or peaches; whilst the dried-up brown cor., standing out straight on all sides from the soft not densely velvety surface, give them also the appearance of those short-spiked balls called Morning-stars (Morgensterne), formerly used in battle. Pods quite enclosed in the inflated cal. 1–2-seeded orbicular. Seeds globose or orbicular *i. e.* somewhat flattened, varying from y. through tawny or chestnut to dark brown or blackish. In the 2-seeded pods they are usually less globose than in the 1-seeded.

I find, like Brotero, the pods usually 1-seeded. Curtis, Smith, Babington, and DeCandolle describe them as 2-seeded.

Though not mentioned in WB.'s Canarian Flora, *T. fragiferum* L. occurs in such profusion in the neighbourhood of Laguna in Tenerife, especially along the road to Las Mercedes, that it could not have been unseen, and therefore was most probably confounded with the next sp., which, on the other hand, I never met with either near Laguna or elsewhere in Tenerife. Both sp. have been sent, however, to BH. and HH. by Bourgeau from the

Canaries; and I have myself lately found abundantly *T. resupinatum* L. in Gomera, an island never visited by MM. Webb and Berthelot.

13. T. RESUPINATUM L.

Quite smooth dark full gr.; st. numerous prostrate or procumbent; lfts. obovate or obcordate finely and sharply serrulate; ped. axillary *rather short about as long as* rarely somewhat longer than *the l.*; heads in fl. *small flat-topped umbellate* with the *involucre or bractlets very minute, fl. shortly stalked radiant, the standard resupinate or below the keel*; heads in fr. large *naked or only slightly pubescent* not velvety subglobose *somewhat loosely botryoidal,* the upper part of cal. much inflated *saccate conspicuously 2-horned beaked lageniform deflexed* scarious *conspicuously* reticulated pubescent *chiefly at the base,* with 2 short *prominent divaricate conspicuous* setaceous teeth.—Brot. ii. 109; DC. ii. 202; EBS. t. 2789 (fl. incorrect); Spr. iii. 218; WB.! ii. 77; Koch 190; Bab. 79.—Herb. ann. Mad. reg. 1, r; PS. reg. 3, r. Dry sunny grassy places near the sea; Machico at the E. and W. end of the beach, abundant in the Plane-tree public walk or Praça. Ascent of Cabo Giraõ (Dr. Lippold); in PS. at the Fonte das Pômbas and N. side of P. de Juliana. May–Aug.—Root strong white fleshy, merely annual. Herbage quite smooth dark gr. St. 2–12 in. long radiato-prostrate but not rooting, very numerous matted in the centre straight slender. Lfts. bright full gr., barred or spotted, remotely nerved as usual, not closely striate. Stip. ovate acuminate or lanceolate finely pointed. Fl. deep rose inclining to purple, conspicuous in radiant umbellate heads like little double daisies with a pale eye, the deep rose-col. standards forming the rays, and the pale pink-edged wings and keel the disk or iris, the centre or pupil of which is again deep rose, consisting of the unexpanded buds. Ped. sometimes shorter rarely longer than the l. mostly erect sometimes in fr. deflexed. Heads small in fl., large in fr. Bractlets or involucre reduced to an inconspicuous ring of very minute transversely oblong truncate shortly ciliate-toothed pale whitish membranous scales, not longer than the very short pedic. of the outer or lowest row of fl. Standard alone resupinate from a twist in its claw, deep rose with darker lines. Two upper teeth of cal. linear-setaceous closely parallel equal pale with a large dense silky-villose tuft of white hairs at their base, the 3 lower teeth larger broader divergent equal deep gr.; tube pale or whitish, smooth in fl., pubescent in fr. all over. Heads in fr. half an in. or more in diam. of a peculiar light transparent apple-gr. not streaked or tinged with red, the large bladdery calyxes deflexed imbricate and standing out distinctly like a bunch of filberds, the 2-horned vaulted upper lip quite concealing the remains of the cor. strongly conspicuously and

elegantly reticulated, resembling short ovate inverted wine-flasks split down in front. Pod very short round 2-seeded.

EBS. t. 2789 wrongly represents the fl. in the heads with the standard (as usual) superior instead of inferior or resupinate. Otherwise the figures are good and characteristic, and in the 2 magnified views of the fl. at the bottom of the plate, the relative position of the sep. and standard (not of the wings and keel) is perfectly correct.

14. T. TOMENTOSUM L.

Smooth light gr.; st. prostrate or procumbent; lfts. obovate or obovate-wedgeshaped sharply and finely serrulate; ped. axillary *short distinctly shorter than the l., often none*; heads in fl. *small* hemispherical with the *involucre or bractlets very minute or obsolete*; *fl. sessile* twice as long as cal. *with obsolete or scarcely any bractlets*; heads in fr. *compactly globose densely cottony or velvety*, upper half of cal. inflated globose or oval bullate scarious reticulated *closely velvety*, the two upper short divergent and deflexed setaceous teeth *minute inconspicuous and like the remains of the cor. concealed in the thick short cottony tomentum or inflated cal.*—Desf. ii. 200; Brot. ii. 110; Spr. iii. 218; DC. ii. 203; Moris Sard. i. 495. t. 64; Koch 190; WB. ii. 77.—Herb. ann. Mad. reg. 1, c/2. PS. reg. 2, 4, r/2. Mad. about Funchal near the sea to the W. by roadsides, in paved walks, and waste ground in dry sunny places. PS. roadside at Camacha and summits of Pico do Castello, P. de Juliana, and P. do Cabrito. March–May.—Root sometimes strong but distinctly only ann. fibrous beset with granular tubercles. Habit like *T. glomeratum* L. Foliage pale gr. altogether smooth. St. prostrate but not creeping, 2–4 in. long, rarely amongst herbage 5 or 6 in., unbranched or nearly so, except at their base. Stip. ovate or lanceolate acuminate. Ped. about half the length of petioles, often wanting, always distinctly shorter than the l. Fl. nearly white with the faintest possible blush of pink or rose, as long again as the cal. and its teeth together. Involucre reduced as in *T. resupinatum* L. to a ring of minute short truncate scales. Heads after fl. enlarged to the diam. of 4–5 lines, perfectly and closely or compactly spherical, white tinged with pale gr. and reddish on one side like a peach in miniature, the inflated cal. on one side the head being reticulated with red veins, otherwise nearly white from the dense velvety tomentum. Remains of cor. like the cal.-teeth not prominent or indeed, except partially or here and there, visible. Pod enclosed 1-seeded. Seed subglobose pale greenish-y.

Differs from *T. resupinatum* L. in the nearly or quite sessile

white cottony or thickly downy close compact heads, with the 2 upper teeth of the inflated cal. after fl. not porrected awn-like or conspicuous, and in the pale or quite white fl. It is also a much more delicate and smaller pl. The heads are more densely or closely velvety than in *T. fragiferum* L.

Bourgeau's Canarian spec. in BH. from Gomera, marked "*T. tomentosum* L. Bourg. Pl. Can. no. 168, Ins. Gomera," are certainly *T. resupinatum* L. But I gathered in Feb. 1858 the true *T. tomentosum* L. in Gomera myself; and I also met with it in Hierro, Lanzarote, Fuerteventura and Gr. Canaria.

IV. *Trifoliastrum* Ser. in DC.; throat of cal. in fr. not inflated or closed, simple and naked within.—Herbage smooth. Fl. crowded sessile erect bractleted, bractlets distinct not forming an involucre.

15. T. GLOMERATUM L.

Wholly smooth bright full gr.; st. *procumbent or ascending*; lfts. obovate or obcordate sharply and finely toothed; heads *globose* sessile axillary and terminal, *distinct and usually remote* sometimes geminate, quite smooth in all stages; fl. dense crowded erect nearly or quite sessile; cal. smooth 10-ribbed unchanged in fr., teeth nearly equal *cordate-ovate* short very acute or sharply setaceo-acuminate, leaf-like 3-nerved *and reticulated at the base, spreading or reflexed*; cor. *conspicuous longer than cal.*, standard much longer than the wings striate.—Desf. ii. 200; Brot. ii. 108; EB. t. 1063; Sm. E. Fl. iii. 307; Buch! 197. no. 408; DC. ii. 198; Spr. iii. 209; WB.! ii. 74; Seub. Fl. Azor. 49. no. 375; Koch 191; Bab. 78.—Herb. ann. Mad. reg. 1, 2, 3, c. PS. reg. 4, $\frac{c}{s}$. Dry rocky waste ground everywhere to the E. and W. of Funchal, at Camacha, on the Caminho central under Pico Grande, &c. In PS. on summits of P. do Facho, do Castello, d'Anna Ferreira, &c. Febr.–June. —Whole pl. quite smooth of a bright full lively gr. St. slender filiform stiff and wiry 2–12 in. long straight flexuose at the divisions. Foliage rather scanty, the l. remote not crowded; the upper opposite. Lfts. unspotted not large, toothed nearly all round, with the teeth very sharp and fine formed by the shortly excurrent nerves. Stip. entire ovate-acuminate produced into a long point membranous nerved. Heads of fl. densely hemispherical or globose, mostly quite sessile distinct solitary, occasionally geminate, rarely shortly stalked. Cal. smooth in all stages, the teeth auricled or broad and dilated at the base full gr. and leaf-like finely awn-pointed, a little stiff or firm but scarcely rigid in fr. Cor. pale rose or pink permanent twice the length of the cal.-tube, standing out all round

the heads, which in fr. resemble little gr. balls stuck full of short brown spikes; much as in *T. fragiferum* L., but with the little spikes more numerous or crowded. Pods 2-seeded enclosed within the cal.-tube. Seeds tawny-yellow "ovate-reniform" Webb; radicle prominent.

16. T. SUFFOCATUM L.

Smooth bright full gr.; st. *prostrate short mostly buried in the soil, the l. alone, and fl. partially, protruding*; lfts. obovate or obcuneate sharply and finely toothed upwards, entire below the middle; heads *pale gr. irregularly diffusely or indeterminately globose,* axillary dense closely sessile, *approximate or crowded, often agglomerate or confluent at the base of the stems,* nearly or quite smooth in all stages, *echinulate* but not rigid; fl. densely crowded erect sessile; cal. nearly or quite smooth 10-striate, unchanged in fr., teeth nearly equal *ovate-acuminate* leaf-like 3-nerved *not reticulated at the base, falcately spreading* or recurved *often obliquely towards one side*; cor. *minute inconspicuous much shorter than the cal.*—EB. t. 1049; Sm. E. Fl. iii. 299; DC. ii. 198; Brot. Phytogr. Lusit. 158. t. 64; Spr. iii. 210; WB. ii. 75; Seub. Fl. Azor. 49. no. 374; Hook. Br. Fl. (ed. 5) i. 81; Koch 191; Bab. 78.—Herb. ann. GD. reg. 2, rrr. Summits of one or two of the highest peaks in the Great or Middle Deserta. May, June.—A minute scarcely discernible inconspicuous pl. with very short stunted st. close-pressed to or buried beneath the surface, often leaving only the l. above ground. Root long slender fibrous. L.-stalks slender filiform longer or shorter as the st. are more or less buried in the soil. Lfts. small immaculate strongly nerved. Stip. broadly ovate acute or shortly pointed. Heads of fl. tufted and mostly irregularly crowded or confluent in the centre of the pl., like little burs or the prickly husks of the Spanish chestnut. Fl. numerous densely crowded. Cor. pale rose, much shorter than the gr. leafy cal.-teeth, which are rather longer and more gradually acuminate than in *T. glomeratum* L. and not auricled or cordate at the base. Cal.-tube somewhat feebly striate, thin and membranous, sometimes a little hairy, not hardened inflated closed or otherwise changed in fr. except in becoming ovate. Pods oblong 2-seeded; "seeds roundish, radicle prominent." (Bab.) Whole pl. often not more than 1–2 in. in diam., the st. rarely exceeding 2 or 3 in. in length. The fl. are rather aggregate in dense axillary tufts or clusters than in distinct determinate globose or hemispherical heads as in *T. glomeratum* L., with the cor. very small and inconspicuous.

Bourgeau's Canarian spec. under this name in BH. are by some mischance nothing but *T. glomeratum* L.

V. *Lotoidea* L.; like the last section; but fl. lax, distinctly stalked, subumbellate, mostly deflexed in fr., and pod 2–6-seeded.

17. T. REPENS L. **Dutch or White Clover.**

Smooth dark full gr.; st. *creeping* diffuse, their ends ascending, *solid*; lfts. obcordate obovate or oval, finely and minutely toothed, the veins excurrent; heads at first hemispherical on long axillary ped. longer than the l.; fl. *distinctly stalked* and somewhat lax, subumbellate, in fr. deflexed; pedic. of upper fl. as long as cal.; cal. smooth, unchanged after fl., teeth lanceolate acuminate erect unequal not more than half the length of cor.; pods linear sessile knobbed 3–4-*seeded*.—Brot. ii. 103; H. Fl. Sc. i. 218; EB. t. 1769; Sm. E. Fl. iii. 299; Buch! 197. no. 404; DC. ii. 198, 9 (*α* and *β*); Seub. Fl. Azor. 49. no. 376; Koch 191; Bab. 78.—Herb. per. Mad. reg. 1, 2, 3, c. Roadsides and waste ground everywhere about Funchal, the Mount, Camacha, &c.; in the Curral das Freiras, Rib. Frio, &c. Nearly at all seasons, chiefly Febr.–July.—St. 6–12 in. long hard firm solid within, weak and loosely straggling, rooting here and there, their ends ascending. Lfts. full gr., mostly pale- or dark-spotted. Stip. entire membranous ovate or oblong, abruptly acuminate. Heads on long axillary curved ascending ribbed or angular light-gr. juicy stalks, at first flat-topped, presently subglobose. Fl. numerous lax rather conspicuous, white or cream-col., often more or less deep pink or rose-purple; standard much longer than the wings acute striate; in fr. loosely deflexed. Pod included, sometimes monstrously protruded like a horn or leaf. Seeds unequally ovoid tawny.

VI. *Lupulina* L. (*Chronosemium* Ser. in DC.); throat of cal. in fr. not closed or inflated, simple and naked within. Standard in fr. enlarged dry membranous sulcate or striate deflexed over the stalked exserted 1-seeded pod.—Foliage smooth. Fl. y.

18. T. PROCUMBENS L. **Hop-Trefoil.**

Main st. erect, branches procumbent more or less hairy or pubescent; lfts. smooth obovate-wedgeshaped often slightly retuse, the middle one distinctly stalked; heads *rather large* at first hemispherical then oblong-globose or oval and obtuse dense *many-fl.* (20–40) axillary stalked; ped. stiff straight erect or erecto-patent longer or shorter than the l.; fl. *numerous crowded*, deflexed and imbricated downwards in fr., their pedic. shorter than the cal.-tube; style *not half the length of the pod;* standard considerably longer than the wings, *strongly furrowed broadly rounded or scallop-shaped, flattened and not conduplicate*

or keeled at the back, vaulted deflexed and curling in over the pod.—Linn.! Sp. Pl. (ed. 1) ii. 772; Brot. ii. 110; EB. t. 945; Hook. Fl. Sc. i. 219; Sm. E. Fl. iii. 309; Buch! 198. no. 411 (sec. ex. in BH. "Downe 1776"); DC. ii. 205; WB. ii. 79; Seub. Fl. Az. 49. no. 377; Koch 194; Bab. 79. *T. campestre* "Schreb."; Spr. iii. 210. *T. agrarium* Huds., Curt. (not Linn.!). "*T. pratense* luteum &c. Vaill. Par. 196. t. 22. f. 3" (Sm.). *Melilotus agraria* Desf. ii. 193 (excl. syn. Linn.).—Herb. ann. Mad. reg. 1, 2, 3, ccc. PS. reg. 2, 3, 4, ccc. GD. reg. 2, c.—Dry waste ground, mountain pastures, hills and rocky peaks everywhere. At most seasons, but chiefly March–June.—St. slender but stiff and firm; the primary or main st. always erect though often very short, with diffuse or decumbent mostly prostrate or procumbent branches 6 in.–2 ft. long spreading widely all round, sparingly subdivided and often dark violet or purple. St. petioles stip. ped. and cal. more or less hairy or pubescent, sometimes nearly smooth. L. distant few and small in proportion; l.-stalks 2–3 lines long; lfts. 2–5 lines long, dark gr. unspotted, very slightly glaucous, smooth or only occasionally sprinkled with a few hairs, the upper in Mad. often subacute or at least not retuse. Stip. half-ovate acute entire, rounded but not auricled or cordate at the base. Ped. longer or shorter than the l. Heads rather large 4–5 lines in diam., at first lemon-y., afterwards becoming tawny-brown or chestnut, dry and scarious, at first hemispherical but soon becoming globose or shortly oval, approaching more or less to oblong, and very obtuse or truncate. Cal. pale gr., 2 upper teeth short ovate, 3 lower long linear-setaceous, subpilose unchanged after fl. Fl. small lemon-y., the lower sessile, the upper shortly stalked. "Wings divaricate," Koch. Standard much enlarged after fl. becoming tawny-brown dry and scarious, arching or curling down over the pod. Pod narrow smooth elliptic pointed at each end. Style $\frac{1}{4}$–$\frac{1}{3}$ the length of the pod, hooked at top. Seeds 1 or 2 "mostly 2" (Brot.) y. oval, the radicle not prominent.

The prostrate or procumbent and more erect forms of this pl., with ped. longer or shorter than the l., are often different stages only of the same individual; and all attempts to distinguish them by verbal definition are frustrated by endless intermediate transitional variations. The ordinary form however in Mad. is certainly that more diffusely spreading or procumbent state, with ped. longer than the l., to which belong the following synonyms: *T. procumbens* Linn! *l. c.*; EB. t. 945; Brot. ii. 110; WB. ii. 79; Bab. 79; var. *α majus* Koch 194; var. *β campestre* Ser. in DC. ii. 205; var. *a* Hook. Br. Fl. (ed. 5) 81. *T. campestre* "Schreb.;" Spr. iii. 210. *T. agrarium* var. foliis non

retusis, Madera 1776 Downe (marked also *T. procumbens*) BH.! *T. procumbens* Buch! 198. no. 411.

A 2nd more erect form, with ped. shorter than the l. (var. *β* Hook. Br. Fl. *l. c.*), occurs only occasionally and at higher altitudes on rocky, moist or shady banks.

A 3rd cognizable but equally transient or trivial local form of the pl. is that dwarf state (*δ nanum* Ser. in DC.?) which grows in short turf whether in maritime or mountain open sunny pastures, with short st. 2 or 3 in. long and numerous crowded heads of fl. Two sheets of such ex. in Herb. Linn., marked simply with the numerals 38 and 39, have been pinned by their illustrious owner to his authentic "38 *procumbens*." A third sheet, without any mark or number, containing 3 spec. of the very same form, has however been similarly affixed by him to his very different authentic "*agrarium* 36;" to which he has also attached another sheet without mark or number of his own, but which has been, I think, rightly named by Sir J. E. Smith in pencil "*agrarium* Fl. An." (*i. e.* Huds. Fl. Angl.) "*procumbens* Lin."

I have looked in vain in Mad. for the true *T. agrarium* L.! (*T. aureum* Poll.), which, with the apparently still more nearly allied *T. patens* Schreb. (*T. parisiense* DC.), said to be distinguished from *T. procumbens* L. by the denticled and cordate stip. auricled at the base, by the longer style nearly as long as the pod, and prominent radicle of the seed, might have been expected to occur.

19. T. MINUS Relh.

St. stip. and foliage as in *T. procumbens* L. but *smaller and more slender*, petioles very short; lfts. obcordate or obcuneate retuse, the middle one distinctly stalked; heads *small subumbellate, about* 12-*fl.*, globose or hemispherical in fr., very obtuse or truncate; ped. axillary distinctly longer than the l., slender but straight and erect; fl. *somewhat lax distinct*, all shortly stalked, tubular, closely deflexed and imbricate in fr.; pedic. shorter than the cal.-tube; style *not* ¼ *the length of the pod*; standard *faintly furrowed or striate, oblong-spathulate truncate entire keeled at the back, conduplicate*, not curling in downwards but *folded together laterally* over the pod.—Relh. Fl. Cantab. ed. 2; EB. t. 1256; H. Fl. Sc. i. 220; Sm. E. Fl. iii. 310; Bab. 79. *T. agrarium* Buch! 198. no. 410 (not Linn.). *T. filiforme* DC. ii. 206 (excl. var. *β*); WB.! ii. 79 (excl. syn.); Koch 195 (not Linn.). *T. filiforme* var. *a major* Hook. Fl. Brit. (ed. 5)

82. *T. lupulinum alterum minus* Dillen. in Ray's Syn. (ed. 3) 330. t. 14. f. 3.—Herb. ann. Mad. reg. 3, r. PS. reg. 4, r. Pico da Silva up the Caminho do Meio, mountain pastures by the Palheiro Levada; Rib. Frio. In PS. on the rocky summit of P. do Facho on the S. side abundant. Apr.-Aug.—Habit entirely of *T. procumbens* L. but altogether smaller or more delicate in every part, mostly smoother, with shorter leafstalks longer peduncles and much smaller looser heads of fewer distinct fl. like little spiked balls only 2–3 lines in diam. Leafstalks very short half as long as in *T. procumbens* L. Stip. half ovate acute entire simply rounded at their outer base. Middle lft. distinctly stalked. Lfts. small more retuse or truncate than in *T. procumbens* L. Ped. often twice as long as the l. Fl. 10–15 subumbellate and all distinctly though shortly pedicelled, tubular compressed lemon-y. small; the standard neither broadly dilated nor with the edge curled in, striate but scarcely furrowed, folded together lengthways but only partially concealing the perfectly ripe pod. "Wings porrected" Koch. Two upper teeth of cal. ovate short; the 3 lower long linear-setaceous mostly hairy towards the tips. Style less than $\frac{1}{4}$ length of the oval swollen half-protruded pod, hooked at the tip. Seeds 1 or 2 chestnut-brown exactly oval, the radicle scarcely prominent.

There are 2 forms of this sp.: 1, the ordinary luxuriant state with st. or branches 6–24 in. long; 2, the delicate dwarf fine-leaved state (Ray Syn. t. 14. f. 3) with the lower heads only 3–5-fld. which approaches in habit so nearly the true *T. filiforme* L.

Three good spec. of this pl. on one sheet marked "*Tr. agrarium* Linn. Sp. Pl. 1087—Madera" in BH. sufficiently attest the syn. *T. agrarium* of Buch. On the other hand, his *T. procumbens* was doubtless founded on the "*T. agrarium* var. foliis non retusis Madera 1776 Downe" of the same Herb. marked also "*T. procumbens*," and which is unquestionably true *T. procumbens* L.!

The true *T. filiforme* L.! EB. t. 1257 (*T. micranthum* "Vivian." DC., Koch), characterized by its very few (2–5 or 6) loosely and remotely fld. racemose umbels, delicate slender habit, pedic. longer than cal.-tube, quite smooth, standard and style much shorter than the pod, which stands in much the same relation as to size and habit with *T. minus* Relh. as the latter does to *T. procumbens* L., has not occurred in either the Mad. or Can. islands. I found, however, *T. minus* Relh. (*T. filiforme* Webb, not L.) in both Grand Canary at El Monte towards the Bandama Crater, and in Hierro up the Vueltas at El Golfo.

10. Melilotus Lam.

Melilot.

1. M. PARVIFLORA Desf.

St. erect or diffuse and ascending; lfts. broadly *obovate-oblong*, the lower obovate or obcuneate, the upper narrow oblong or lanceolate and somewhat feebly or irregularly serrulate, all obtuse; stip. lanceolate-acuminate; fl. *very small shortly stalked, in crowded dense* many-fld. not awned or mucronate rac.; pedic. *not above half the length of cal.*; sep. *nearly equal*; cor. *but little longer than cal., wings and keel equal, nearly or quite as long as standard*; pods small smooth *subglobose or roundish-oval very obtuse* somewhat *faintly and remotely corrugate or reticulately rugulose* 1-seeded.—Desf. ii. 192; DC. ii. 187; Spr. iii. 206; Koch 183; Seub. Fl. Azor. 49. no. 369. *M. indica* (All.) WB.! ii. 67; Buch! 197. no. 402; Moris Sard. i. 459. t. 56. *Trifolium Melilotus Indica* Brot. ii. 102.—Herb. ann. Mad. reg. 1, cc; PS. reg. 2, 3, cc; ND. $\frac{r}{2}$; GD. reg. 2, $\frac{r}{2}$; SD. $\frac{c}{2}$. Cornfields and open sunny places almost everywhere; in Mad. only near the sea, as about the Praia, cliffs to the E., P^{ta} S. Lourenço, &c.; in PS. more up the hills. March–July.—St. branched 1–2 ft. high, the side-branches ascending. Whole pl. smooth with a strong bitterish hay-like scent, especially in drying; foliage bright full gr. Lfts. before flowering rather large and broad, 9 or 10 lines long, 4 or 5 broad; the lower nearly or quite entire, the upper narrow-oblong toothed. Stip. ovate-lanceolate finely acuminate sometimes obsoletely denticulate at the base. Fl. minute bright y. in dense cylindric crowded spikes rather than rac. 1–2 in. long. Sep. all equidistant nearly equal. Pods orbicular and turgid, rather subglobose than ovate, 1 line in diam., not mucronate beaked or bordered, pale with only 3 or 4 remote arched transverse anastomosing wrinkles, reticulate or corrugate, not plaited. Seeds oval flattened rufescent closely and minutely granulate; *radicle not prominent.*

2. M. LIPPOLDIANA Lowe.

St. erect; lfts. broadly *roundish-obovate*, or shortly wedge-shaped *suborbicular*, the upper oblong-obovate, sharply unequally denticulate; stip. obsolete or small narrow linear-acuminate; fl. *middle-sized loosely racemose distinctly stalked*, rac. not awned or mucronate; pedic. *about the length and cor. twice the length of cal.*, wings *shorter than the keel and standard*; cal. $\frac{2}{3}$, sep. *unequal*; pods 1-seeded smooth *turgidly ovate beaked keeled or bordered*, somewhat *closely ribbed* with *distinct arched wavy plaits or wrinkles.*—Hook. J. Bot. viii. 292. *M. italica* Buch! 197. no. 403. *Trifolium Mel. italica* Sol.! in BH. (not Linn.).—

Herb. ann. Mad. reg. 1, r. Waste open ground near the sea; Praia Formosa to the W. of Funchal; Brazen Head (Sr. Moniz, Mr. J. Y. Johnson).—A somewhat larger stouter more leafy pl. than *M. parviflora* with larger short broad rounded lfts., much larger longer-stalked fl. in rather loose rac., and more strongly closely and regularly transversely ribbed or wrinkled pods. St. branched erect 1–2 ft. high. Stip. small lanceolate narrowly and finely acuminate entire. Lfts. rounded or very broadly wedge-shaped 5–10 lines long and nearly or quite as broad; the lower entire, the upper sharply and finely toothed. Fl. bright y., becoming deeper golden-y. in drying, in lax mostly short not mucronate rac. Cal. slightly 2-lipped, the two upper teeth approximate. Keel as long as standard, wings shorter. Pods 1½ line in diam., *i.e.* larger than in Madeiran but not larger than in French spec. (Castigneaux, 22nd May 1848, E. Bourgeau, no. 120) in BH. of *M. parviflora* Desf., ovate subglobose and turgid, distinctly mucronulate or beaked, with a keeled edge or border, much more strongly regularly and closely arcuato-costate than in *M. parviflora*, but still less approaching *M. sulcata*, the ribs or wrinkles being wavy or flexuose and subanastomosing, yet again scarcely corrugate or rugoso-scrobiculate, and not imbricate. Seeds evenly globose, pale reddish-chestnut or rufescent, closely and minutely granulate; *radicle not prominent.*

I had long ago (Febr. March 1828) observed this pl., but without separating it from *M. parviflora* Desf.; and my attention was more particularly drawn to it in 1838 by Dr. Lippold. More recently it has been again observed by Sr. Moniz and Mr. Johnson.

In drying, the fl. of this Melilot become deeper- instead of paler-col., and the l. turn almost uniformly to a peculiar dark reddish-brown; and by this latter mark an old imperfect spec. from Madeira in the BH., ticketed by Solander "*Trifolium Melilotus italica*, Linn. Sp. Pl. 1078, Madera," was at once recognizable. It is quite distinct however from *M. italica* Lam.

3. M. SULCATA Desf.

St. erect or diffuse and ascending; lfts. *lanceolate-oblong*, the lower obovate, the upper linear-oblong, all sharply serrate; stip. linear-acuminate *toothed or laciniate at the base*; fl. middle-sized distinctly stalked in loose *distinctly mucronate or awned* finally elongated rac.; pedic. not quite the length and cor. nearly twice the length of cal.; sep. equal; wings shorter, keel *equal to or longer than the standard*; pods 1-seeded smooth *orbicular compressed very obtuse elegantly and regularly many-ribbed or*

plaited, plaits *arched or circular parallel close crowded large and imbricated.*—Desf. ii. 193; Moris Sard. i. 463. t. 59; WB.! ii. 67, 68; β, DC. ii. 189; Koch 184. *Trifolium Mel. segetalis* Brot. ii. App. 484; DC. ii. 187.—Herb. ann. Mad. reg. 1, r. PS. reg. 2, c. Cornfields in Mad. to the W. of Funchal above the Gorgulho, Praia, &c., and on Pta de S. Lourenço; in PS. general, as between the town and Fonte d'Arêa, halfway up Pico do Facho, P. do Concelho, in the Serra de Fora, &c. March–May.—Habit much the same as in *M. parviflora*, but a somewhat smaller stiffer-branched almost inodorous or at least much less strongly-scented pl., scarcely above 6–12 in. high. It is further distinguished by the much narrower more evenly sharply and finely toothed lfts. which are 6–10 lines long, 1–3 broad, the more ovate or less wedge-shaped form of those of the lower l., the toothed or jagged stip., the larger fl. (nearly as large as in *M. Lippoldiana*) in much shorter laxer fewer-fld. rac. terminated by a rather long mucro or barren prolongation of the rachis, and above all by the large and elegantly circularly ribbed or plaited pods. These are always 1-seeded in Mad., 1½ line in diam., more compressed or flattened than in either of the other 2 sp., especially than in *M. Lippoldiana*, and not mucronulate beaked or bordered. Seeds orbicular slaty-brown or blackish, prominently and distinctly granulate, angular, with a deep groove in the middle from the *prominent large radicle.* Fl. bright-y. turning mostly pale in drying like those of *M. parviflora.*

11. MEDICAGO L.

Sect. i. *Lupularia* Ser. in DC.—Fl. racemose or spicate; pods kidney-shaped, sickle-shaped or subspiral unarmed, the edge or margin entire.—St. erect or prostrate. L. 3-nate. Fl. y. rarely v.

1. M. LUPULINA L.

More or less pubescent; st. procumbent or ascending spreading widely; stip. obliquely ovate-acuminate, the upper entire the lower slightly toothed; lfts. roundish-obovate or obcuneate denticulate notched and mucronate at top, entire downwards; spikes many-fl. short dense oval; fl. very small and shortly stalked; pods 1-seeded compressed kidney-shaped somewhat turgid with the point spiral, rugose with arcuate prominent branched veins.—Brot. ii. 112; Buch! 198. no. 416; EB. t. 971; Sm. E. Fl. iii. 318; DC. ii. 172; Seub. Fl. Azor. 48. no. 366; Bab. 74. *M. lupulina a*, Koch 177.

Herb. ann. Mad. reg. 1, c. Waste ground about the Quinta do Valle near Funchal; moist grassy spots along the whole S. coast on or below the sea-cliffs, as at the Arco de Calheta, Paul do Mar, &c. Irregularly at almost all seasons throughout

the year.—Pl. of a rather dull or hoary dark gr. St. 6–18 in. long spreading widely, the ends ascending. Fl. lemon-y. in little compact oval or oblong short heads on axillary ped. longer than the l. Pods brown or blackish scarcely spiral smooth or slightly pubescent arcuato-reticulate 1-seeded. Seed ovate-reniform.

Common Lucern (*M. sativa* L.) is occasionally cult. about Funchal for fodder, but has shown no tendency to naturalize itself. It is characterized by its Melilot-like erect bushy habit 1–2 or 3 ft. high, oblong lfts. toothed upwards, axillary many-fld. rac. of handsome violet-blue fl. on ped. longer than the l. with *pedic. shorter than the br. or cal.*, and *many-seeded* adpressedly pubescent scarcely reticulate 2–3-*whorled* pods.

Sect. ii. *Spirocarpos* Ser. in DC.—Fl. umbellate; pods distinctly spiral of several turns or volutions.—St. prostrate or procumbent. L. 3-nate. Fl. small y.

* Pods unarmed, with a simple entire thin sharp edge or margin.

2. M. ORBICULARIS All.

Quite smooth; stip. laciniate with long setaceous teeth; lfts. obcordate obcuneate or obovate, toothed upwards; ped. 1–3-fl. awned shorter than the l.; pods very smooth and shining pale brown mostly orbicular and flattened or lenticular, of 4 or 5 membranous or foliaceous finely radiately-veined mostly incumbent and closely (sometimes loosely) spiral volutions with sharp thin entire even edges, many-seeded; seeds flattened subtriangularly rounded-obovate, very closely and finely granulate or dotted.—*Pods closely spiral*, Moris. Hist. ii. t. 15. f. 1; Brot. ii. 113; Buch! 198. no. 418; DC. ii. 174; Moris Fl. Sard. i. 434. t. 37; Koch 177; WB.! ii. 60, 61, var. *α*, *β*. *M. polymorpha* A. *Orbicularis* Desf. ii. 210.—*Pods loosely spiral*, *M. marginata* Willd., Moris. Hist. ii. t. 15. f. 2; DC. ii. 174; Koch 177. *M. orbicularis* var. *γ*. *marginata* WB.! l. c.

Herb. ann. Mad. reg. 1, ☉. Grassy places in waste ground near the sea. Cliffs to the E. of Funchal along the Caniço road, Brazen Head, &c.; to the W. about the Gorgulho and upwards towards Pico da Cruz, &c. March–May.—Sparingly leafy. St. slender hard and wiry angular prostrate 6–12 in. long spreading flat all round unbranched except at the base pale gr. sometimes dark purplish or violet. Foliage rather thin and scanty; lfts. rather small dark gr. Fl. small lemon-y., mostly two together but rarely more than one producing fr. Pods large and conspicuous $\frac{1}{2}$–$\frac{3}{4}$ inch in diam. parchment-like in substance and of a peculiar light-gr. or yellowish colour whilst immature, when

ripe pale drab-brown with a paler edge or border, becoming altogether darker or blackish when old; almost always quite smooth in Mad., but occasionally a little puberulous or ciliate at the edge, mostly flat or disk-like with the turns closely superincumbent, but sometimes on the same pl. the volutions are loosely coiled and more or less drawn out like a corkscrew, constituting apparently *M. marginata* Willd. or *M. orbicularis* γ. WB. l. c.; the edges very thin sharp and entire, often turned a little either up or down, plain or flat and even in the disk-like pods, and slightly waved or plaited in those that are drawn out. Seeds many pale yellowish or rufous compressed somewhat triangular or shortly pear-shaped.

** Pods (normally) armed, the edge or margin spinose.

3. M. LAPPACEA Desr. in Lam.

Nearly or quite smooth succulent stout leafy; stip. large deeply laciniate and fringed with long setaceous teeth; lfts. large obovate-wedge-shaped, the lower obcordate, all unevenly or irregularly toothed; ped. 2–5-fl., 1–3 or 4 only fertile, not awned; keel shorter than wings; pods rather large agglomerate firm quite smooth of 4–5 arcuately ribbed or veined turns or volutions thickly spinose at the edge, spines crowded hooked at the tip; seeds tawny-y. oblong scarcely reniform.—*M. lappacea* Lam., *nigra* Willd., *Terebellum* Willd., *Histrix* Ten., *pentacycla* DC., *denticulata*, WB.! (not Willd.).

a. macracantha Lowe; pods subglobose large mostly in threes forming blackish bur-like globular heads with numerous thick-set long slender spines equal to or exceeding in length the breadth of the pod and mostly radiant or standing out straight horizontally rarely subdivergent.—*M. lappacea* Desrouss. in Lam. Dict. iii. 637, 638. *M. ciliaris* Brot. ii. 114 (not Linn.). *M. muricata* Buch! 198. no. 419 (nec alior.). *M. nigra* (W.) DC. ii. 178. *M. pentacycla* DC. and *M. Histrix* (Ten.) DC. ii. 177. *M. pentacycla* Seub. Fl. Azor. 48. no. 368. *M. denticulata* β. *macracantha* WB.! ii. 64 (not *M. denticulata* Willd.).—Herb. ann. Mad. reg. 1, and PS. reg. 2, 3, cc; GD. reg. 2, $\frac{r}{2}$; SD. rr. Waste ground amongst vineyards and by roadsides; about Funchal especially to the E. along the Caniço road, &c.; in PS., Serra de Fora, Serra de Dentro, back of Pico de Juliana, grassy slopes nearly at the top of P. do Castello, &c. Jan.–June.—Distinguished by its large densely glomerate subglobose hedgehog- or bur-like masses of fr. composed almost uniformly of 3 pods, and its somewhat coarse rank succulent leafy habit. Whole pl. robust dark full grass-gr. copiously leafy nearly or quite smooth in all its parts except the cal. with the stalks and midribs of the l. beneath whilst young, which are slightly pubescent towards the ends of the shoots. St. long trailing or prostrate spreading 1–2 ft. in all

directions from the centre or crown of the root; the ends ascending; more stout and succulent than in most of the other Madeiran sp. Foliage or rather lfts. large and copious. L. on rather long stalks; lfts. $\frac{1}{2}$–$\frac{3}{4}$ in. long, $\frac{1}{4}$–$\frac{1}{2}$ in. or more broad, with shallow unequal teeth, sometimes entire; the lower broadly obcordate. Stip. conspicuous, irregularly but deeply and remarkably cut and fringed. Fl. small bright golden-y. (*flavus*) mostly in threes, upwards in fives or even more, rarely in fours. Pods always perfectly smooth, dark blackish-brown, diam. including spines 3–6 lines, axis 3–5, mostly in threes, often in twos, rarely in fours or fives together; spines 1–2 lines long in a single row on each side the plain not thickened even edge or margin, radiant or standing out horizontally all round, rarely subdivergent, rather weak or soft and slender, quite smooth, channelled at the base. Sides or surface of the pods seldom reticulate never lacunose, but usually with somewhat strong curved simple rarely branched nerves or ribs radiating obliquely from the inner edge or central axis of the spire to the circumference, one to the base of each spine. Seeds large $1\frac{1}{2}$–2 lines long, half as broad, oblong not at all or only slightly reniform, scarcely notched at the *hilum*, fulvous or tawny-y.

The description of *M. lappacea* in Lam. Encycl. iii. 637 agrees precisely with the present pl. in all respects except in ascribing "sometimes only 2 or 3" volutions to the pods, which are also said to be "flattened and often a little concave at each end,"—expressions referring doubtless either to the tricyclous form or var. of the present pl. (not found in Madeira), or even possibly to some example of *M. denticulata* Willd. not then distinguished from the true *lappacea*. The same remark applies also to Brotero's *M. ciliaris*.

β. brachycantha; pods rather smaller harder or more compact mostly in pairs or single shortly cylindric flat and abruptly truncate at each end, spines crowded or numerous but very short stout and thickish, not longer than half the breadth of the pod, curved and divergent *i. e.* bent upwards and downwards parallel to the axis of the spire, or straight and radiant.—*M. Terebellum* Willd. DC. ii. 176; Koch 181. *M. Sardoa* Moris, "Inter segetes prope Pulam Sardiniæ, Aprili" U. S. Müller! in HH.—Herb. ann. PS. reg. 3, r. Grassy slopes below the rocky summit of P. do Facho on the E. side descending towards the road or ridge between the Serra de Dentro and Serra de Fora. March–May.—Similar in every respect to *α*, except in the smaller shorter-spined not bur-like pods in pairs instead of threes. Diam. of pods 3–4 lines; axis 2–3 lines; spines $\frac{1}{2}$–$\frac{3}{4}$ line long.

A mere var. or form of *α*, into which it passes through various

gradations in size and shape of pods, length and direction of their spines, &c. In its extreme form of least development and utmost divergence of the latter, the pods considerably resemble those of *M. minima* Desr. γ, but are much larger. It has occurred only in P^to^ S^to^ growing sparingly amongst beds of α. *M. denticulata* Willd. (EBS. t. 2634) differs in the 2–3- (not 4–5-) whorled smaller flattened or subdiscoidal less firm or softer thinner or more membranous strongly and distinctly reticulately lacunose or pitted pods, and less leafy luxuriant or succulent habit. It has not occurred in either the Madeiran or Canarian group.

The 2–4- or 3-whorled-fruited form or var. (=*M. lappacea* DC. *l. c.* no. 46; Seub. *l. c.* no. 367 = ? *M. denticulata* γ. *lappacea* WB. *l. c.* = *M. denticulata* α. *tuberculata* (short-spined) and β. *lappacea* (long-spined) Moris Fl. Sard. i. 447. tt. 47, 48 = ? *M. denticulata* β. *lappacea* Koch Syn. ed. 2. 181) has not occurred in Madeira. Both Lamarck and Brotero appear to include it under their respective syn., *M. lappacea* Lam. and *M. ciliaris* Brot.

Although I have thus included Webb's var. γ. *lappacea* with the other tricyclous-podded syn. above mentioned, in deference to his char. "fr. minore subtricyclo," yet his collector Bourgeau's pl. in BH. and HH., ticketed "*M. denticulata* W. var. *lappacea*, Canaria, Barr^o^ de la Angostura, Mart. 1846, Pl. Can. no. 384," has the pods distinctly pentacyclous, and is precisely *M. lappacea* α. *macracantha* i. e. *M. denticulata* β. *macracantha* Webb. Nor have I myself ever met with his "subtricyclous" γ. in any of the Canary Islands.

4. M. CILIARIS Willd.

Not quite smooth succulent robust leafy; stip. large deeply laciniate and fringed; lfts. large obovate or obcuneate finely and sharply toothed upwards, puberulous beneath; ped. 2–3-fl. awned, 1 or 2 fl. fertile; keel longer than wings; pods *very large globose or ovoidal thickly hairy-webbed and spinose*, of 6–8 turns; spines crowded numerous *long and slender* straight divergent *interlacing hairy* not hooked at the tip; seeds large black reniform. —DC. ii. 180. no. 76; Moris Fl. Sard. i. 452. t. 51; Bourg. ! Pl. Can. in BH. no. 86, Teneriffa, S. Diego. *M. polymorpha* D. *Ciliaris* Desf. ii. 212. *M. intertexta* Willd., DC. ii. 180. no. 75, and "Fl. Fr. iv. 546" (not All. which = *M. Echinus* DC.).—Herb. ann. Mad. reg. l, r. Cornfields about the Fort and above the small "Crater" at the E. end of the Praia to the W. of Funchal. May.—Habit like *M. lappacea*: distinguished by its partial hairi-

ness and very large globular webbed bur-like pods clothed with long thick-set interlacing hairy spines standing out straight on all sides like a chestnut-husk. Whole pl. smooth except the pods which are thickly hairy, and the l. which though smooth above are minutely adpresso-puberulous beneath. St. prostrate 1–2 ft. long; foliage dark dull gr.; lfts. large, sometimes dark-spotted. Fl. 2 or 3 together, mostly 2, larger than in *M. lappacea*, pale lemon-y. (*luteus* v. *citrinus*). Pods half an inch in diam. not truncate but rounded at each end, pale gr., light brown when ripe, hedgehog-like especially whilst young, with numerous close compact volutions, the margin thickened and beset on each side with a row of long subulate flexible interlacing hairy spines clothed with arachnoidal or interweaving hairs like those of the common Burdock (*Arctium minus* Schk.).

Webb refers to this pl., but not as a Can. sp., in WB. ii. 63, at the end of his account of *M. intertexta* All. (*M. Echinus* DC.). The true *M. ciliaris* Willd. is however found in Tenerife. *M. intertexta* All., distinguished by its very large oblong-ovoidal perfectly smooth unwebbed pods with vertically divergent closely and curiously interwoven spines, has not occurred in Madeira, although found in Gr. Canary.

5. M. TRIBULOIDES Desr. in Lam.

Hairy-pubescent; stip. large laciniate fringed, lfts. obovate or obcuneate strongly and regularly toothed; ped. mostly 2- or 4-fl. awned; pods *pale or whitish* cylindric flat or truncate at each end nearly or quite smooth, ultimately *hard and corky rugged or pitted*, of 3–5 or 6 close-set volutions *remotely and shortly spinose*, the margin raised and thickened; spines few distinct *short thick stout conic or bulbous* at the base, scarcely hooked at the tip; seeds or.-y. oblong.—Herb. ann. Mad. reg. 1, $\frac{c}{2}$; SD. reg. 1, rr; PS. reg. 1, rrr. Waste rocky sunny places to the E. and W. of Funchal, and in PS. to the SW. of the town. March–July.—Varr.:

α. Fr. large (diam. $3\frac{1}{2}$–4, ax. 3–$3\frac{1}{2}$ or $4\frac{1}{2}$ lines) subglobose shortly cylindric, spines rather long spreading or divergent every way like those of a chestnut-husk.—*M. tribuloides* DC. ii. 178; WB. ! ii. 65; Koch 178, var. *γ. rigidula*. *M. polymorpha* F. *Tribuloides* Desf. ii. 212. *M. muricata* Brot. ii. 116? (not of others). *M. interupta* (sic—qu. *intertexta*?) Buch ! 198. no. 417. *M. polymorpha ε. intertexta* Madeira Fr. Masson 1777, BH. !—Mad. to the E. of Funchal along the Caniço road about the Louros, Neves, Brazen Head, &c. plentifully; sea-cliffs, in the S. Deserta very rare, passing into *β*; not found in PS.—Distinguished from all the preceding by its hairiness, and by its nearly smooth or naked

pale or whitish, coarsely rugged or pitted, hard and corky pods which are distantly and shortly spined resembling a caltrop or the fruit of *Trapa natans* L., as the specific name well expresses. Whole pl. especially the l. softly downy, and of a slightly greyish-gr., otherwise most resembling *M. lappacea* Desr., though perhaps of somewhat smaller less rank or succulent luxuriant habit, with more prostrate wiry st., considerably larger fl. and smaller heads of fr. St. often purplish, densely hairy or downy. Stip. deeply cut and jagged or fimbriate, the teeth shorter less narrow numerous and regular than in *M. lappacea* Desr. Lfts. more strongly and regularly toothed, very downy, of a dull dark somewhat glaucous-gr., immaculate. Ped. shorter than the l. with a long awn, mostly 2- or 4-fl., rarely 1- or 3-fl., never more than 4-fl. Fl. large in comparison with those of *M. lappacea* or *M. minima*, bright golden-y., keel a little longer than the wings, shorter than the standard which is nearly as broad as long. Pods from the first almost or quite veinless, but often a little hairy, as large perhaps individually as in *M. lappacea* *a*; but since 2 only are usually produced, they do not form the large bur-like heads of fr. characteristic of that pl., and the spines, though longer in the unripe than ripe pod, instead of being slender long and crowded, are comparatively stout short conic thick or even bulbous at the base and remote, with their points indistinctly if at all hooked, and the edge raised or thickened like a cord or belt. When ripe they are excessively hard rude and corky in appearance, with the surface coarsely pitted or uneven, and instead of turning brown or black, like all the preceding sp., they are always pale or whitish, becoming as they ripen frequently quite smooth. The spines vary considerably both in length and direction; either standing out all round in various directions like those of a hedgehog, or, especially when more short and bulbous-conical, reflexed and bent up and down vertically or parallel to the axis of the pod, locking its turns together and constituting the var. *β*, which however blends into *a.* by imperceptible gradations. An extreme form or state of this, with also smaller longer more cylindric truncate and distinctly hairy pods, which are more rarely or remotely and very shortly bulbously-spinous, occurs above the "Crater" at the E. end of the Praia Formosa, constituting var. *β*, no. 2.

β. Fr. large (diam. 3–4, ax. 3–5 lines) cylindric often distinctly hairy, spines very short thick and bulbous strongly reflexed up and down and interlocking.—*M. tribuloides a. genuina* Koch *l. c.* About the crater at the E. end of the Praia Formosa to the W. of Funchal.—Two forms may be distinguished: 1, fr. larger, diam. $3\frac{1}{2}$–4, ax. $3\frac{1}{2}$–5; and 2, fr. smaller, diam. $2\frac{1}{2}$–3, ax. 3–$4\frac{1}{2}$ lines.—A mere state of *a*, with longer more cylindric subpubescent fr., and shorter bulbous interlocking spines; volutions 5 or 6 rarely 7.

γ. Fr. small, diam. 2½ lines or 5 mill., ax. 2 lines or 4 mill., shortly cylindric subdiscoidal, spines short and thick, reflexed.—*M. littoralis* Rohde, DC. ii. 177; WB.! ii. 62; Koch 178; Bourg.! Pl. Can. no. 184 in BH. De Heldreich! ex. exsicc. in BH. and HH. *M. tribuloides* Bourg.! Pl. Can. no. 768 in BH. and HH.—PS. to the SW. of the town, Campo Debaixo, abund. Dec. 1856 (Sr. J. M. Moniz).—With the smaller foliage, though not the more delicate habit, of *M. Helix* Willd. rather than of the two preceding varr. of *M. tribuloides* Desr., this is a completely annectent link between the two sp. Still it is a larger more robust pl. than *M. Helix* W. *a. calcarata* to which it otherwise approaches nearest, with stout stiff straight st. 3–4 ft. long, and villose grey or hoary lfts. Ped. a little longer than the l., and 4–6-fl. Pods clustered smaller and less flattened than in *M. Helix* W., and coarser ruder or thicker in substance and formation, nearly or quite smooth with 3–4 volutions, and distinct remote short thick bulbous-conic spines, larger and stouter considerably than in any state of *M. Helix a*, and reflexed vertically up and down parallel with the axis, instead of radiating horizontally.—This form or var. has never occurred in Mad., whilst on the other hand the common Mad. *M. tribuloides a.* has not occurred in PS.

Amidst all its variations in size of pods, their degree of smoothness, and the length and direction of their spines, *M. tribuloides* is usually recognizable by the fr. as it ripens becoming rude and thick or corky, and by the spines being more or less tumid thick or bulbous at the base.

6. M. Helix W.

Hairy-pubescent almost villose, greyish; st. prostrate slender tough and wiry; stip. *lanceolate sparingly and remotely incisolaciniate*; lfts. obovate sharply serrulate at top, the lower retuse; ped. 1–8-fl. awned; pods *orbicular discoidal* pale *rather small quite smooth membranaceous venose* of 3–5 turns *remotely and very shortly or minutely spinose, sometimes nearly or quite unarmed*; seeds or.-y. reniform oblong.—Varr.:

a. calcarata; ped. rather longer than the l.; 1–5-, mostly 2–3-fl.; pods discoidal slightly thickened and pitted or rugulose, their edge armed with minute distant very short straight radiant spinules; diam. 3–3½, ax. 2–2½ lines.—*M. Helix β. spinosa* WB.! ii. 61. t. 56 (*M. canariensis* Benth.); *M. Helix β. spinulosa* Moris Sard. i. 438. t. 39. B. *M. calcar* Lowe in Hook. J. of Bot. viii. 291 and ix. 75.—Herb. ann. PS. reg. 1, 2, r. Sunny hill-sides here and there. Sloping banks at the back of the beach or foot of the sea-cliffs 2 miles to the E. of the town, and ascent (N. side) of Pico Debaixo abund. April, May.—This the normal state in P^to^ S^to^ of the sp. must be admitted to

approach very closely to *M. tribuloides* Desr. var. γ. (*M. littoralis* Rohde): but even when the pods are more than usually thickened and rugulose, they are scarcely rude and corky, and the spinules are vastly more minute and delicate, and always radiant like little spur-rowels. The fr. is also larger and orbicular or more flattened vertically, and the stip. are more sparingly or inconspicuously fringed or laciniate. It must be owned however that this form of the sp. presents a completely transitional or intermediate step from the unarmed var. β. (*M. Helix* Willd. of authors) through *M. littoralis* Rohde to *M. tribuloides* Desr.

I formerly referred (Journ. of Bot. viii. p. 292) Bourgeau's *M. tribuloides* no. 768 in BH. to the present pl.; but his no. 768 in HH. gathered at the same place and time is certainly *M. tribuloides* γ. *supra*: and therefore the BH. example, though in itself somewhat ambiguous, is most probably the same. This shows however how closely the two pl. *M. Helix* α. and *tribuloides* γ. (*M. littoralis* Rohde) run into each other.

β. *inermis*; ped. about the length of the l.; 2–8-, mostly 3–6-fl.; pods lenticular clustered nearly or quite unarmed even (not rugulose) altogether thin and membranous or foliaceous; diam. 3–3½, ax. 1½ lines.—*M. Helix* Willd. Sp. Pl. iii. 1409? (DC. ii. 174 under *M. lævis* Desf.); Moris Sard. *l. c.* t. 39. A.—Herb. ann. PS. reg. 4, rrr. Summit of Pico do Castello on the walls of the old fortress. April, May.—Merely a more robust luxuriant form of α, growing in a higher cooler moister instead of low dry sandy situation. St. stouter and longer, ped. rather shorter with more numerous fl. and larger clusters of pods than in α; the pods also flatter and more foliaceous.

Characterized in both its varr. by its more delicate habit and small lfts.; and particularly from α. and β. of *M. tribuloides* Desr. by the comparative smallness of all its parts, by its less divided or fimbriated narrower stip. and smaller flattened discoidal membranous unarmed or delicately spinulose veined pods. St. from 6–12 in. long rigid wiry hard and very tough, pubescent. Lfts. 2–4 or 5 lines long villose. Fl. large lemon-y., wings as long as keel and both nearly as long as standard. Pods orbicular flattened at each end, very peculiar in appearance; in α. like little spur-rowels, with few very short and distant minute fine radiating spikes, which are sometimes reduced to scarcely more than little points not reaching beyond the keel, and thus passing gradually into β, in which they are quite obsolete or evanescent; in α. the pods have sometimes a little of the rugose thickened corky appearance of the pods of *M. tribuloides*, but in β. they are much more even, thin and membranous (reminding one, except in size, of those of *M. orbicularis* Willd.), and

in both varr. not reticulated, but with a few remote oblique transverse veins. The spinules when present never exceed half the diam. of the pod in length, and always stand straight out horizontally, like rays, in the plane of the pod, not (as sometimes in *M. tribuloides* Desr. and as in *M. littoralis* Rohde) bending alternately up and down vertically parallel to the axis; they originate from a rib parallel to and below the sharp prominent keel on each side of it. Volutions in both varr. close and compact, almost always 4.

I follow, though with some doubt even with regard to *β*, considering Willdenow's descr. and synonym, the high authority of Mr. Bentham in referring this pl. to *M. Helix* Willd. When spec. of *a.* collected by me in 1828 were first shown to him some years ago by the late Dr. Lemann, he had considered it a new sp. allied to his *M. reticulata* from the S. of France and Spain: and I accordingly proposed it as distinct in the J. of Botany under the name of *M. calcar*. Subsequently I found it had been previously named by Webb on his *plate* t. 56 figuring the sp., *M. canariensis* Benth., although in the *text* of his Phytographia Can. it is referred to *M. Helix* W.—Lemann (in litt.) had rightly considered it nearer to *M. littoralis* Rohde than to *M. reticulata*. Willdenow insists on the pods in his *M. Helix* having only *two* distant volutions, and quotes with a ? *M. lævis* Desf. ii. 213, a pl. described as having its st. smooth and pods "scarcely 2-whorled." He adds, "Leg. fere ut in *M. obscura* sed anfr. binis non arcte adpressis diversa. A sequenti (*M. tornata*) distincta leg. non cylindricis, anfr. tantum binis." This seems to point to something different from even *β.* of my pl., which is however assuredly *M. Helix* of Moris and of De Heldreich!, Parlatori!, Pavillon!, Bourgeau! in HH., &c.

Not found in Mad.: but in P^to^ S^to^ taking the place of the Madeiran *M. tribuloides a.* and *β*, which on the other hand have not been found in P^to^ S^to^.

7. M. MINIMA Desr.

Silky-pubescent or villose hoary-grey; stip. nearly entire or the lower sparingly toothed, ovate-lanceolate acuminate; lfts. obovate or obcordate wedgeshaped and entire below, sparingly and sharply toothed at top, often 3-toothed; ped. short 1–3-mostly 2-fl.; pods dark brown small globose somewhat hairy with 3–5 rather lax turns, densely spinose with straight crowded subdivergent slender spines mostly hooked at the tip, grooved and distinctly 2-forked at the base; seeds reniform y.—DC. ii.

178; Spr. iii. 290; Moris Sard. i. 450; WB. ii. 64; Koch 180.—Herb. ann. Mad., reg. 1–3, PS. reg. 1–4, ccc. March–June.

a. longispina; pods thickly spinose, spines spreading long slender hooked at the tip, not pungent, about equalling or exceeding the diam. of pod; stip. sometimes sparingly toothed.—*M. minima* β. *longispina* and γ. *uniflora* Benth. in EBS. at t. 2635. *M. minima a. pubescens* and β. *hirsuta* WB. ii. 65. *M. minima* β. *canescens* and γ. *longiseta*, *M. mollissima* (Roth) and *M. Græca* (Hornem.) DC. *l. c.*; *M. recta* (Desf.) DC. ii. 179. *M. mollissima* Spr. Syst. iii. 291. *M. minima* β. *mollissima* Koch *l. c.* *M. polymorpha* H. *Recta* Desf. ii. 212. *M. polymorpha minima* Fl. Dan. t. 211. Mad. and PS., ccc, in waste rocky ground and mountain pastures everywhere, especially below 1500 ft. and near the sea; to the E. and W. of Funchal, Loo fields, Praia Formosa, Brazen Head, P^ta^ de S. Lourenço, the Piedade, &c.; SD. at top, rrr. Pods (*with spines*) 3–3½ lines in diam., spines about one line long.

β. *brevispina*; pods thickly spinose, spines spreading or subreflexed short not above ½ diam. of pod, strong pungent, not hooked; stip. mostly entire.—*M. minima a. brevispina* Benth. EBS. t. 2635. *M. minima* Brot. ii. 115; Sm. E. Fl. iii. 321; Bab. 74. Not noticed in Mad., but in PS. c, though far less so than *a*; cliffs to the E. of town, roadside at Camacha, Pico d'Anna Ferreira, P. do Castello, and ascent of P. Branco mixed with *a*. Pods (*with spines*) 2½ lines in diam., spines about half a line long.

γ. *pulchella*; pods unarmed, spines undeveloped and almost or quite reduced to their forked base, very short and strongly reflexed, not reaching beyond the edge or margin of the 3–4 volutions.—*M. pulchella* Lowe Novit. 25 or 547.—Herb. ann. Mad. reg. 1, rrr; PS. reg. 2, 3, r. Brazen Head outside the hummock (intermixed with *a.*) plentifully, and sparingly halfway between Funchal and the same along the edge of the sea-cliffs: PS. hill-sides about 2 miles E. of the town; April, May.

In all these varied forms, or modifications, *M. minima* is distinguished by its comparatively diminutive size, excessive hairiness, and the smallness of all its parts from the preceding sp., except *M. Helix* W. Whole pl. usually densely and softly pubescent or villose and more or less silky and of a dull hoary gr. St. 4 or 5 to 10 or 12 in. long, hard and stiff or woody. Lfts. small retuse, with a point or mucro in the notch, and a larger prominent tooth on each side of it. Ped. in starved ex. 1-, in others 2–3- or 4-fl. Fl. very small lemon-y. Standard longer than the keel which is longer than the wings. Pods small 1½–2 lines in diam. without the spines, globose. From their never bursting, and the consequent germination of the seed

within them, the pod from which the pl. has sprung is found constantly attached at the crown of the root. Sometimes two pl. spring from the same pod; but usually only one seed germinates. In γ. the pods are strikingly dissimilar, with a peculiarly neat appearance: apparently but not really smaller than in α. or β. from their spines being reduced to little tooth-like plaits or tubercles locking the 3½–4 remarkably compact or close volutions of the little pill-like pods together, like the cogs or teeth on the upper and under sides of a pair of horizontal wheels: they are mostly in pairs and erect. In all other respects the pl. does not differ from the common spiny-podded state, of which it is doubtless a mere unarmed var. The two forms however are found growing always intermixed; and thus the variation cannot be ascribed to difference of soil or situation.

Occasionally in α. the root becomes strong and woody, throwing out numerous cespitose prostrate st.; but this is merely a luxuriant state of the pl. due to better soil and a more abundant supply of water.

I cannot find any warrant for the formation of varr. founded on the degree of villosity (varying from simply pubescent to densely silky-tomentose), or number of fl. on the ped. In both these respects it ranges indefinitely according to dryness or elevation of locality.

Tribe IV. *Loteæ*.

12. Lotus L.

1. L. PARVIFLORUS Desf.

Wholly pilose; st. slender branched erect procumbent or ascending; lfts. narrow linear-lanceolate or obovate-wedge-shaped; stip. large broadly cordate-ovate acute; *umbels villose 4–6-fl.*; *ped. after fl. curved or arched downwards*; cal.-teeth straight linear-subulate as long as the cor., 2–3 times as long as the tube; *pods very short scarcely so long as the sep.* ovate-oblong turgid smooth 6–8-seeded.—*Dorycnium parviflorum* DC. ii. 208; Seub. Fl. Azor. 49. no. 378.—Herb. ann. Mad. reg. 1, 2, c. Rocky dry ground and mountain pastures general. March–June. —Var.:

α. *robusta*; larger with thicker stouter more upright st. and larger broader lfts.—*L. parviflorus* Desf. ii. 206. t. 211. *L. microcarpos* Brot. ii. 119?—At or above 2000 ft. r.; banks by the roadside a little beyond the Church at Camacha descending

into the ravine, and in the Serra beyond, towards S. Antonio. May, June.

β. *tenuis*; smaller with more slender filiform procumbent st. and smaller lfts.—*Lotus parviflorus* Deless. Ic. i. t. 30.—Chiefly below 2000 ft. c. in dry rocky waste ground, but also in dry mountain pastures; about Funchal on the top of the rocks E. of the Quinta do Valle or W. cliff of the Rib. de João Gomes, &c. March–May.

A small hoary pl. of delicate habit, especially in β, and rather short duration, with soft flaccid quickly withering foliage. Root small fibrous. St. pale yellowish or straw-colour (in α. browner) much branched, mostly prostrate at first, their ends ascending, 3–6 in. long, very slender and filiform; in α. more robust and upright. Whole pl. clothed with long soft white hairs, which in drying often turn brown or fulvous. Lfts. and stip. as usual entire. Lfts. bright gr. but hoary with their long hairs; in β. small and delicate. Stip. inequilaterally ovate large and leaflike. Fl. in dense villose umbels small plain y. inclining to lemon, not at all streaked or marked with red, turning bluish-gr. or greenish-black in drying. Cal. densely hairy, sep. very long and slender. Style distinctly capitate. Ped. about an inch long, exceeding the l., densely pilose especially in α, slender filiform; immediately after fl. and in fr. bent down strongly in an arch; with mostly a single leafy shortly stalked linear-lanceolate br. or lft. close below the fl. Pods smooth even very short and turgid acute brown; the valves not twisting spirally after bursting as they do in all the other Mad. sp. Seeds pale y. minute orbicular compressed.

The foregoing description is taken from pl. of β, which is in Mad. by far the more ordinary form, and of which indeed α. is scarcely more than a luxuriant state, due to a moister soil or atmosphere.

2. L. HISPIDUS Desf.

Pilose; st. prostrate *much branched intricate subcespitose* slender elongated subflexuose pale gr. or straw-colour; lfts. lanceolate or obovate-cuneate; stip. inequilaterally ovate half-cordate acute; *umbels* 3-*fl.* on rather long erect ped.; cal.-teeth straight linear-subulate shorter than the cor., twice the length of the tube; pods cylindric subtorulose *short turgid thickish* about twice as long as the sep. or cal. and 5 or 6 times as long as broad, 8–12-seeded.—"Desf. Cat. Hort. Par. 190;" "Loisel. Fl. Gall. 490. t. 16;" DC. ii. 212; Seub. Fl. Azor. 49. no. 379; EBS. t. 2823; Bab. 80. *L. pilosissimus* (Poir.) DC. ii. 212? *L. divaricatus* Sol.! in BH.; Buch! 198. no. 413; Novit. 546, 7. *L. angustissimus* β. Hook. Brit. Fl. (ed. 5) i. 83.—Herb. ann. Mad. reg. 1, 2, 3, ccc.

GD. reg. 2, $\frac{c}{2}$.—Dry sunny rocky ground and mountain pastures everywhere. Top of rocks E. of the Quinta do Valle near Funchal, the Praia Formosa, mountain pastures 3000 ft up the Caminho do Meio, Serra beyond Camacha, at Caniço, S^{a} Anna, mouth of the Rib. da Janella, bed of the Rib. da Metade, summit of the Pico da Suna, &c. May–Sept.

St. prostrate very numerous branched and often almost matted or cespitose, 6–18 in. long, slender pale or whitish. Whole pl. pilose, but hairs shorter less copious and silky than in *L. angustissimus* L. Stip. leafy. Ped. filiform, considerably longer than the l., 1–1$\frac{1}{2}$ in. long, straight or curved, not deflexed, with mostly 3, sometimes 4 or 2, very rarely 5 or 1 fl., 3 being the normal number by a vast majority. Fl.-bract or lft. lanceolate, always in Mad. single. Fl. much larger than in *L. parviflorus* Desf., but slightly smaller than in *L. angustissimus* L., bright full orange-y., with the standard streaked inside and tinged outside with red, turning in drying a peculiar dark indigo-gr. Pod 3–6 lines long, $\frac{1}{2}$–1 line thick, very straight and equably cylindric, beaked by the simple (not forked) long straight slender minutely capitate persistent style; the valves twisting spirally after bursting. Seeds small globose pale y. speckled with rufous or plain light brown.

Constantly distinct from *L. angustissimus* L. in habit, pale st., less hairiness, mostly smaller or finer foliage, rather smaller deeper orange fl. turning gr. in drying, normally 3- (not 2-) fl. umbels on mostly longer ped., and above all, by the short and twice as thick pods. Both pl. occur continually growing intermixed.

A starved maritime smaller more hairy state than usual of this pl., of which I have a spec. gathered in 1827 by Herr Holl, is possibly *L. cytisoides* of his List, which otherwise omits the present common sp. altogether. The true *L. cytisoides* L. is not found in Madeira.

3. L. ANGUSTISSIMUS L.

Very pilose; st. firm and stiffish procumbent or diffuse sometimes erect; lfts. lanceolate or oblong-obovate; stip. inequilaterally ovate or lanceolate half-cordate acute; *umbels 2-fl.*; ped. in all stages straight erect longer than the l.; cal.-teeth straight linear-subulate, nearly twice the length of the tube, much shorter than cor.; pods subtorulose *linear long narrow-cylindric very slender* straight 4 or 5 *times longer than cal.* and 10 or 12 times as long as broad, 18–24-seeded.—Brot. ii. 119; Hook. Brit. Fl. (ed. 5) 83 (var. *a.*); Koch 198; Scub. Fl. Azor. 49. no. 380; Bab. 80; WB.! ii. 85 (excl. syn. *L. hispidus* Desf.). *L. angustissimus* and *L. diffusus* Ser. in DC. ii. 213. *L. diffusus* Sol.! in BH.; Buch! 198. no. 414; EB. t. 925.—Herb. ann. Mad. reg. 1, 2, 3, c. With the

last sp. here and there, general, but less common or abundant. Top of rocks to the E. of the Valle Quinta near Funchal. Chestnut woods at the Jardim da Serra. Along the Levada in the Rib. das Cales above the Arrebentão, bed of the Rib. da Metade, and summit of Pico da Suna above Porto da Cruz, mixed with *L. hispidus* Desf. May–August.—St. 6–12 in. high, generally more or less erect, in young pl. often quite so, finally spreading or diffuse. Habit leafy with the st. somewhat stout firm or stiff and reddish-brown or purplish downwards. More hairy with mostly larger foliage than *L. hispidus* Desf., of a dark dull gr. Lfts. and stip. inequilateral. Ped. about an in. long, both in fl. and fr. longer than l., and in fr. sometimes twice as long, but varying on the same pl. Fl.-bract often 3-foliate, lfts. lanceolate. Fl. normally 2, often 1, rarely 3 together, rather larger than in *L. hispidus*, full y., the standard streaked inside and tinged at the base outside with red; sometimes in dry spots orange, but generally paler than in *L. hispidus*, and never turning gr. or blackish-indigo in drying. Style simple, not forked or toothed; stigma plainly though minutely capitate even to the naked eye. Pods slightly torulose (knobbed or knotted) smooth and shining, dark rich reddish-brown, ¾–1 in. long, ½ line broad, beaked by the straight persistent style, lomentaceous within, with distinct transverse membranous partitions or diaphragms between the seeds, which are small orbicular compressed (not globular) and plain testaceous or fulvous brown.

4. L. ULIGINOSUS Schkuhr.

Perennial cespitose robust sprinkled more or less with hairs, rarely quite smooth; st. procumbent or ascending, more or less erect, succulent stout hollow; lfts. elongate-obovate; stip. large short and broad roundish-ovate subcordate and unequal at the base; heads or umbels flat-topped many-fl. on long stout upright stalks; cal.-teeth linear-lanceolate leafy, ciliate-hairy stellate spreading or recurved in the bud like a star, hairy, not longer than the tube, much shorter than the cor., the 2 upper teeth divergent; pod smooth cylindric straight slender 4 or 5 times as long as cal. and 8 or 10 times as long as broad, 20–25-seeded.—Koch 197. *L. major* EB. t. 2091; Sm. E. Fl. iii. 313; Bab. 80. *L. corniculatus* β. *major* DC. ii. 214; Seub. Fl. Azor. 49. no. 382 *a*. —Herb. per. Mad. β. reg. 1, 2, 3, c or ccc; γ. reg. 3, rrr.

β. *glabriuscula* Bab. l. c.; nearly smooth the edges and veins only of the lfts. stip. br. and sep. pilose; st. procumbent or ascending.—*L. major* β. Bab. l. c. *L. corniculatus sylvaticus* Brot. ii. 121. *L. odoratus* Holl's List in Hook. J. of Bot. i. 20 (not Schousb. or Sims in BM. t. 1233).—Moist steep banks about waterfalls or dripping rocks and borders of streams, general. Particularly abundant along the sea-cliffs of the S. coast from the Cabo Girão

westward. About Funchal, S^ta^ Anna, S. Vicente, &c. May–September.

Root perennial long thick somewhat fleshy stoloniferous. St. 2 ft. long or more, nearly solid at the base, hollow and without pith upwards, stout purplish smooth, but sometimes sprinkled with a few long soft spreading hairs, cespitose, forming a large spreading tuft, quite prostrate at the base, their ends ascending and approaching to erect. Foliage dark full gr. flaccid quickly withering. Lfts. large oblong-obovate or elongate-obovate sprinkled with long soft hairs, the 2 side ones inequilateral; glaucous beneath. Stip. very large broad leafy short and roundish inequilateral half-cordate, also hairy like the l. Fl.-br. 3-foliate, lfts. large very broadly ovate, the 2 side ones inequilateral half-cordate short. Ped. 2 or 3 in. long. Fl. scentless rather large, 10–12 or more in a large close head or umbel, often about 20, rarely so few as 6 or 8, of a somewhat duller y. than in *L. corniculatus* L. *a.*; standard saffron-red outside especially in the bud, streaked internally at the base with saffron lines; it turns gr. in drying. Shorter filaments simple scarcely dilated upwards. Cal.-teeth densely hairy, almost woolly in the bud, and stellate like those of *L. odoratus* Sims in BM. t. 1233, mostly purplish, ovate, with long subulate hairy or ciliated points; in fl. and fr. lanceolate, the 2 uppermost diverging at an acute angle. Pods cylindric about an in. long, $\frac{1}{10}$ in. or nearly $1\frac{1}{2}$ line broad, dark coffee-brown quite smooth and nearly even, spreading or drooping, tipped with the slender straight minutely capitate simple style. Seeds orbicular compressed small, one millim. in diam., plain yellowish-brown or fulvous.

γ. *pisifolia*; smooth glaucous; st. suberect spreading or diffuse branched throughout dichotomously, very stout thick firm hollow; lfts. and stip. very large.—*L. pisifolius* Novit. 24 or 546.—Wet grassy bank by a spring called the Junquêiro or Juncêiro on the S. side of Pico Grande at the beginning of the ascent from the Caminho Central; also in a very wet spot halfway down the Voltas below the Cruzinhas on the road to Seixal. July, Aug. —Very different in aspect and habit, but proved, by examination of the Pico Grande pl. subsequently in its place of growth, to be a merely transitory rank luxuriant state of β.

Whole pl. quite glaucous and except the cal. nearly smooth. St. 2–3 ft. high and as thick as the little finger, quite smooth and glaucous, spreading or reclining but more erect than in β, regularly forked throughout flexuose or zigzag and branched alternately in one plane, the branches expanding in a fan-shaped manner. Foliage very large and pale glaucous gr., as glaucous as in the common Garden Pea (*Pisum sativum* L.); lfts. 1–2 in. long, $\frac{1}{2}$ in. broad. Stip. rather larger than the lfts., sprinkled like them towards the edges with a few long hairs. Ped. 4–6 in. long bearing at top close beneath the heads or densely crowded

umbels a single ternate l. like the other l. Fl. 12–15 in a head, full y. Cal. campanulate, the tube quite smooth pale gr., teeth always dark gr. narrow acuminate rather longer than the tube fringed with long white soft hairs, woolly and stellate in the bud. Standard faintly streaked with red indistinct not confluent lines. Shorter filaments not dilated upwards.

13. PEDROSIA Lowe.

* Ped. 1–5 or 6-fl. Fl. subumbellate y. or or.

1. P. NEGLECTA Lowe.

Suffrutescent *mostly gr. and rarely glaucous hoary-grey or silvery*, yet clothed with fine short close-pressed inconspicuous pubescence; st. *elongated wiry slender lax and widely spreading* procumbent or diffuse not intricate or cespitose; l. *distinctly stalked*; *lfts. and stip. unlike* but both *submucronulate with the midrib slightly excurrent*; lfts. obovate or obcuneate twice as long as broad, either obtuse *and mucronulate or subacute*; stip. *inequilaterally deltoid or rhomboidal scarcely longer than broad and broadest* at or near the base, *mucronulate and subacute*; ped. *long curved slender* 3–5-*fl.*; pods rather *short and thick* scarcely 4 times the length of cal. *straight torulose* smooth 10–12-*seeded.*—*Lotus cornieulatus* var. Sol.! in BH. quoad ex. in schedis tantum duabus inscriptis "*Lotus cornieulatus* Linn. variet. Madera Fr. Masson 1776," et "*Lotus cornieulatus* Linn. var. Madera 1776 Downe" (not Linn.). *L. cornieulatus* Buch! 198. no. 415 (not Linn.). *L. glaueus* β. nob. MSS. olim. *L. eytisoides* Holl in J. of Bot. i. 20? $\frac{\text{Shr.}}{2}$ subper. Mad. reg. 1, r. Sea-cliffs to the E. of Funchal between Fort S. Jago and the Louros, and to the W. between the Soccorridos and Camera de Lobos. July, Aug.—Habit somewhat resembling that of *L. corniculatus* L. except the wiry woody st., but much more like that of *L. eytisoides* L., being altogether greener with a more herbaceous look, and with larger thinner flatter lfts. than in any of the following sp. except *P. argentea*. St. sparingly branched with elongated and distinct not interwoven and entangled branches, and not bushy or cespitose as in *P. glauca* Ait., the branches 1–2 ft. long rambling slender stiff and wiry, for the most part gr. though woody. L. not crowded always distinctly stalked; petioles 1–2 lines long. Lfts 2–4 or even 5 lines long 1–2 or 3 broad, foliaceous flat and membranous, not thick or succulent. Stip. shortly and broadly rhomboidal or rounded-deltoidal, not attenuated downwards but on the contrary broadest below their middle, leafy, 1–2 lines long and broad. Ped. 1–3 in. long mostly curved or flexuose but moderately stout, with a 3-foliate fl.-br. at top close below the mostly 4- or 5-fld. umbel. Fl. smaller than in *P. glauca* (Ait.) and of a less full golden (not at all or.) y., more like those of *L. cornieulatus* L. but not turning gr. in drying. Cal. dark purple at the base;

sep. lanceolate $\frac{2}{3}$, the 3 lower exactly equal considerably shorter narrower and smaller than the 2 upper. Style very distinctly forked or toothed; stigma slightly capitate. Pods $\frac{3}{4}$ in. long, 1 line thick, torulose but not moniliform or strangulate, straight spreading, dark coffee-brown.

This may be subdivided into 2 states or varr., viz. *α. virescens*; gr. herbaceous in aspect though shrubby, with long straggling branches, longer ped. (2–3 in.), and larger more naked lfts. and stip., approaching *L. cytisoides* L. much in habit and appearance, and growing in moister or more sheltered spots: and *β. cinerea*, with more the habit of *P. glauca*, i. e. more suffruticulose or bushy, with shorter branches and smaller greyer or even silvery-silky foliage, the lfts. being only 1–2 lines long by $\frac{1}{2}$–1 line broad, the petioles 1 line long, and stip. 1 line long and broad. Such spec. occur only late in the autumn (Oct.) before the rains or after the summer drought, along the sea-cliff to the E. of Funchal between Fort S. Jago and the Louros, and are merely depauperated states of *α*, formerly confounded by me with *P. glauca*. On the other hand, var. *α.* more resembles *Lotus cytisoides* L. or *L. prostratus* Desf., which are not however (quoad ex. in HH.) true *Pedrosiæ*, having the style simple. Hence however the present pl. rather than the small starved maritime state of *Lotus hispidus* Desf. above mentioned was probably Holl's *L. cytisoides*.

2. P. GLAUCA (Ait.).

Suffrutescent glaucous-grey very finely and shortly adpresso-pubescent not silvery scarcely silky-hoary; st. slender filiform much branched and entangled cespitose prostrate or procumbent; l. very shortly stalked or sessile rarely all sessile; lfts. and stip. alike in size and shape crowded small often a little succulent or fleshy, twice as long as broad, mostly obovate or spathulate obtuse or rounded at top, not mucronulate, the midrib not excurrent; ped. rather short 2–4-fl.; pods rather short and slender 2–4 times the length of the cal., irregularly beaded or moniliform and often here and there strangulate from abortion of the seeds, smooth 10–30-seeded; seeds globose, often in part abortive. —Varr.:

α. intricata: lfts. and stip. *obovate or spathulate obtuse*; partly stalked, sometimes all or often nearly all sessile.—*Lotus glaucus* Ait.! Hort. Kew. (ed. 2) iv. 392; DC. ii. 210; Buch! 198. no. 412; Holl's List in Hook. J. Bot. i. 20. *L. glaucus α.* and *β.* Sol.! in BH. *L. glaucus* WB.! ii. 84 (in part only, and excl. icon. t. 61). "*L. corniculatus* Linn. variet. Madera Francis Masson 1776," Sol.! in BH. quoad ex. in scheda una e tribus sub eodem nomine (non

Linn.).—$\frac{\text{Shr.}}{2}$ subper. Mad. reg. 1, cc; PS. reg. 1, rr; ND. ccc; GD. c; SD. $\frac{1}{2}$. Sea-cliffs, rocky slopes and borders of the beach almost everywhere along the S. coast of Mad., as *e. g.* at the Gorgulho and P^ta^ da Cruz near Funchal, and on P^ta^ de S. Lourenço chiefly beyond Labra; forming on the Ilheo dos Embarcadores and I. de Fora as on the N. and S. Desertas large dense mats or beds of herbage, and brought by boatloads for fodder to Machico. In PS. on the headland called Malhado or P^ta^ de Guilherme on the N. coast. Spr. chiefly March–June, but occasionally throughout the year.—Root tap-shaped strong woody white scarcely more than biennial. Branches thin and wiry tough but flexible very numerous and entangled, spreading flat all round from the crown of the root, and forming a thickly leafy mat 1–3 ft. in diam. of a dull glaucous grey enamelled with the numerous little umbels of conspicuous bright-y. or or. fl. Pubescence thick-set and close-pressed yet fine and short. Lfts. crowded very small and short, obtuse or rounded at top and attenuated at the base, 1–2 lines long and half as broad the midrib never excurrent; stip. exactly similar to them in size and shape. Petioles mostly $\frac{1}{4}$–1 line long though sometimes all or almost all the l. are nearly or quite sessile with the petiole scarcely or not longer than broad. Ped. about $\frac{1}{2}$ or $\frac{3}{4}$ in. long, rarely more, with a 3-foliate sessile fl.-br. at top close below the mostly 2–4-, often 1-, very rarely 5-fl. head or umbel. Fl. rather larger than those of *L. corniculatus* L., deep golden-y. or or. and streaked more or less with reddish, often varied with or fading into dark rich saffron-brown. Cal.-tube purple; sep. lanceolate $\frac{2}{3}$, the 2 upper larger broader and longer, all stellate in the bud. Pods $\frac{1}{2}$–1 in. long, $\frac{1}{2}$–1 line thick slender strongly moniliform or beaded and here and there irregularly strangulate. Seeds 10–30, mostly 12–20, very small, 1 millim. diam. quite globose smooth and shining, very dark plain coffee-brown or almost black.

The pointed appearance and lanceolate or elliptic shape of the lfts. in certain depauperated altogether sessile-leaved states of this pl. from hot dry situations, is merely caused by their edges having become unnaturally revolute from heat or drought.

β. dubia; somewhat greyer or more hoary than *a*, but not silky-villose; l. chiefly stalked; lfts. and stip. *elliptic* or *obovate-lanceolate acute*.—Mad. reg. 1, rr. P^ta^ de S. Lourenço on the Ilheo dos Embarcadores, a few pl. only, growing amidst a profusion of rank luxuriant pl. of *a. intricata*, March, April, 1861.—Lfts. 1–2 lines long and half as broad above their middle, almost all decidedly acute. Nearly all the l. distinctly stalked, with petioles a line long. All the rest exactly as in *a*, between which and *P. florida* it is a truly intermediate form. Indeed it is a very nice point to determine whether it should be affixed to *P. glauca*

or prefixed to *P. florida*: but the distinct leafstalks and want of silky villosity incline the scale in favour of the first alternative.

L. glaucus Sol. MSS. in BH., and therefore of Ait. Hort. Kew., was established on two ex. without fl. but in fr. of the Madeiran pl. on a single sheet marked by Solander himself "*Lotus glaucus* β, 1. Madeira prope Funchal J. B. and DS. 1768," and "2 Madeira prope Ponta Saõ Lourenzo, Fr. Masson 1777." In the 1st of these the l. are all nearly or quite sessile; in the 2nd some of them are shortly stalked (petioles $\frac{1}{4}$–1 line long). Hence in his *diagnosis* Sol. says "foliis sessilibus;" whilst in his *description* occur the words "brevissime petiolata." Hence also Webb's wrong reference of "*L. glaucus* β. Soland.! MSS. in herb. Banks." (Phyt. ii. 85) to the very distinct Tenerifan *L. sessilifolius* DC.: for no. 1 on this sheet is assuredly (strictly speaking) Solander's original type of *L. glaucus*, and notwithstanding the altogether sessile l. = the common Madeiran pl., no. 2, with which in fact Solander has associated it.

Another sheet in BH. contains two ex. marked also by Solander "*Lotus glaucus* MSS. *a.*, 1. Madera F. Masson 1776 (juxta ponta de Crux)," and "2. Ins. Canar. Teneriffa Fr. Masson 1778." Of these the 1st (which is in fl. and fr.) accords exactly with the 2nd of the two ex. on the former sheet in having some few of the l. similarly stalked; and perhaps this was the cause of Solander marking it with an *a.* as varietally differing from one at least of the two above-named spec. marked β; though in his MSS. he does not preserve, or indeed notice such distinction; rather indicating by certain corrections in them a sense of its futility.

The Tenerifan spec. (Masson 1778) on this sheet (in fl. only) is a mere fragment in bad condition; but it probably belongs to the very distinct *Pedrosia tenella* Lowe.

There exists yet a 3rd sheet in BH. marked by Solander "*Lotus corniculatus* Linn. variet. Madera Francis Masson 1776," but which I believe to be precisely identical with his *L. glaucus* as above explained and exemplified. Some of the l. have petioles 1 line long. This possibly occasioned its reference by Solander to *L. corniculatus*, as being rather in his judgment identical with the Madeiran pl. on two other sheets so-called by him (*Pedrosia neglecta* Lowe), than with his *L. glaucus*, before he had abandoned his first idea of the latter being characterized by having uniformly sessile leaves.

Webb, having sent me from Orotava in 1829 a single spec. of the true *L. glaucus* Ait. *a. intricata*, has subsequently confounded with it two very distinct and hitherto undescribed sp., *P. tenella* and *P. leptophylla* Lowe, the last of which he has also unfortunately figured (Phyt. Can. t. 61) for the true "*L. glaucus* Hort. Kew.," and again probably at t. 60 for the true *L. sessilifolius* DC., a not uncommon pl. in Tenerife (near S^ta^ Cruz and Guimar), but very unlike his t. 60. This confusion is completely proved by his and Bourgeau's spec. sent as "*L. glaucus* Ait." "or Hort. Kew." in BH. and HH., which all belong either to *P. leptophylla* or *P. tenella*. The true *L. glaucus* Ait. I was myself unable to discover anywhere in Tenerife; and indeed in all the Canary Islands I only once met with a single pl. of it on the W. coast of Fuerteventura on the remote desert shore of the Playa Biocho. The spec. however from Webb of true *L. glaucus* Ait. above referred to as sent to me by him in 1829, appears from his accompanying letter, dated Orotava, to have been collected by him on the W. coast of Tenerife, on which during a six months' residence near Orotava, and in shorter subsequent visits, I could myself find nothing but *P. tenella*. This sp. indeed, abounding all along the W. coast of Tenerife from Orotava to Garachico, must be assuredly the pl. intended by Webb under his *L. glaucus* by the words "In rupibus maritimis Teneriffæ occidentalis copiosa." His other localities for *L. glaucus* between Las Palmas and Telde in Gr. Canary, I have never visited: but the common Gr. Canarian sp. on barren hills above Las Palmas to the N. is *P. leptophylla* Lowe.

The nearest approach to the true *L. glaucus* Ait. exhibited by any spec. from Webb or Bourgeau in HH. or BH. is presented in 3 sheets or sets of spec. from Tenerife named *L. dumetorum* Webb MSS., but not described or alluded to in his 'Phytographia Can.' They are no. 803 of Bourgeau's first (1846) and nos. 1321 and 1322 of his second (1855) Tenerife collections: and though I cannot at all assent to their supposed affinity to *L. arenarius* Brot., indicated by the words "*L. arenarius* Brot. var.?" appended to the name *L. dumetorum* Webb MSS. in nos. 1321 and 1322, there seems less objection to their being regarded as extremely luxuriant or robust states or var. of *L. glaucus* Ait.; though at present I am more inclined to consider them with Webb as constituting a distinct and undescribed sp.

The two sp. above mentioned as confounded by Webb with *L. glaucus* Ait. may be thus distinguished:

1. *Pedrosia tenella*; suffrutescens tenuiuscula hispido-pubescens prostrato-dumosa, ramulis erectiusculis tenuibus patenti- vel reflexo-velutinis; fol. petiolulatis sessilibusque; foliolis stipulisque conformibus obovatis obtusis subciliatis raro acutiusculis; ped. filiformibus breviusculis reflexo-hispidulis 1–5-fl.; cal. hispidiusculis; leg. rectis cylindricis æqualibus longiusculis nigris 10–30-spermis.—*Lotus glaucus* WB. ii. 84 quoad "Hab. In rupibus maritimis Teneriffæ occidentalis copiosa." *Lotus glaucus* Bourg.! Pl. Can. in itin. 2do (1855) no. 1323 in BH. et HH. —*Hab.* copiose in maritimis plagæ occidentalis Tenerifæ ab Orotava usque ad Garachicum.—A very distinct and pretty sp. at once known by its peculiar bristly or hispidulous pubescence spreading or reflexed on the branches and fringing the lfts.: it abounds on the sea-cliff road between Realejo and S. Juan de la Rambla, and again at the east end of Garachico. Two states or var. may be distinguished: *α. virescens*, hispida; and *β. cinerea*, sericea.

2. *Pedrosia leptophylla*; fruticulosa tenuis arcte adpresso-pubescens intricato-dumosa, ramulis divaricatis intricatis erectiusculis tenerrimis filiformibus adpresse puberulis; fol. plerisque sessilibus quibusdam subpetiolulatis; foliolis stipulisque subdifformibus minutis tenuibus adpresse pubescentibus acutiusculis, his obovatis, illis lineari- v. elongato-spathulatis deorsum attenuatis; ped. filiformibus tenerrimis adpresse puberulis breviusculis 1–2- (raro 3-) floris; cal. nudiusculis s. glabriusculis; leg. curtis æqualibus cylindricis torulosis 8–15-spermis.—*Lotus glaucus* WB. ii. 84 quoad icon. t. 61; ejusd. quoad ex. 2 in HH. "*Lotus glaucus* Hort. Kew., Ad littora ins. Canariensium, P. B. Webb Esq.," inscripta. (N.B. *L. sessilifolius* Webb *l. c.* t. 60 has been also more probably drawn from a spec. of *P. leptophylla* than from one of the true *P. sessilifolia* (DC.), for which it was intended: and in his description the words "foliis.... aut brevissime pedicellatis" and "foliolis.... aut ovato-linearibus" again show that he confounded *P. leptophylla* with *P. sessilifolia* (DC.).) *Hab.* passim in collibus marit. apricis juxta civit. Las Palmas Ins. Canariæ Magnæ, vulg.

3. P. FLORIDA Lowe.

Suffrutescent *pale ashy-grey or whitish*; adpressedly and densely silky-grey or hoary almost silvery-silky-villose; st. slender cespitose subprostrate or procumbent; l. quite sessile; lfts. and stip. alike, crowded small *elliptic lanceolate or obovate-lanceolate acute quite sessile* scarcely fleshy; ped. short, 3–5-fld.; pods *straight evenly cylindric moderately long and thickish* smooth 2–4 times as long as the cal. and 12–20-seeded.—Hook. J. Bot. viii. 294.—$\frac{\text{Shr.}}{2}$, subper. PS. reg. 1, r. Zimbral d'Arêa at the

Porto dos Frades, April, May.—Habit of *P. glauca*, but with perhaps less prostrate more upright or ascending st., more silky villose pale and grey or hoary foliage, larger more numerous deep-or. fl. often 4 or 5 in a head, lanceolate acute lfts. and stip., the former sessile on the branches or without any common footstalk, and larger somewhat thicker straighter not moniliform or strangulate but only subtorulose or evenly cylindric pods, which are scarcely or about an inch long and $\frac{3}{4}$–$1\frac{1}{4}$ line thick. Ped. about $\frac{1}{2}$ in. long 1–5- or 6- mostly 3–5-fld. with a 3-foliate sessile leaf-like br. at top. Cal. as in *P. glauca a.* In PS. this fine pl. seems to take the place of *P. glauca*, which occurs however here and there on the N. coast. At Porto dos Frades in the Serra de Fora, *P. florida* grows in vast profusion, almost clothing the Zimbral d'Arêa or sandy fossiliferous slope at the S. base of Pico do Concelho, which it makes perfectly brilliant rich with its large rich orange fl. often streaked or stained with dark coffee-brown, forming quite a carpet. A few pl. of *P. macrantha* grow intermixed; but this sp., like *P. Porto-sanctana*, rather affects more rocky situations. Amongst whole beds of pl. of *a. aurantiaca*, with deep-orange fl., occurred a patch of 6 or 8 pl. of a beautiful var., viz.

β. sulphurea; fl. pale sulphur or straw-colour. Zimbral d'Arêa, rrr; with equally large and almost more copious fl. of a very delicate pale greenish sulphur-y. or light straw-colour, the standard having a few pale streaks of purplish at the base, somewhat like those of *L. macranthus*, but without the violet-purple keel, &c., and in large heads or clusters as in *a*, with which it also perfectly agrees in habit, pods, and foliage. In both varr. the fl. are quite scentless.

P. florida is totally distinct from the common Canarian *L. sessilifolius* DC., WB.! ii. 85 (vix ic. t. 60?), but it very possibly may be a mere local state or extreme form of *P. glauca* (Ait.). I have never met with any pl. in the Madeiran group that on due examination could be mistaken for the true *P. sessilifolia*.

The above description was taken solely from the Zimbral d'Arêa spec. In a few others discovered only recently in my Herbarium, and which were gathered in June 1832 on hills near the sea a mile or two to the E. of the town of P^to^ S^to^, I find a very few of the lfts. on the more vigorous leaf-bearing branches with petioles $\frac{1}{4}$–$\frac{1}{2}$ line long. In other respects the spec. agree with the Zimbral pl. This of course invalidates the claim of *P. florida* to rank as distinct from *P. glauca*.

** Ped. short 1-fl. Fl. greenish tipped with blackish-purple.

4. P. MACRANTHA Lowe. *Cabelleira.*

Suffrutescent *dull glaucous-green subcinereous very finely and minutely adpresso-puberulous scarcely silky-hoary*; st. slender stiffish bushy procumbent or diffuse; l. very distinctly stalked; *lfts. and stip. unlike very small,* the latter *transversely oval or rhomboidal nearly sessile,* the former roundish-obovate obtuse or retuse minute; fl. *solitary on short axillary ped. versicolorous*; pods *very long and straight evenly cylindric many-seeded smooth*; *seeds* 30–40 *minute orbicular compressed* shining dark brown.—*Lotus macranthus* Novit. 24 or 546.—$\frac{\text{Shr.}}{2}$, subper. Mad. reg. 1, r; PS. reg. 2, 3, 4, c. Mad., Brazen Head, outside the hummock on sunny rocky slopes. PS., hill-sides and highest rocky peaks, general. March–June.—Root scarcely more than ann. or at most bienn. nearly simple or tapshaped flexuose whitish soft brittle juicy. From its woody suffrutescent crown spring several partly prostrate st. spreading all round to the length of a span or more, forming usually a little bushy shr. They are round smooth and purplish at the base, hoary upwards with close-pressed silky hairs, and altogether stouter stiffer and less wiry than in *P. glauca.* Foliage much finer and smaller than in that sp., less close or dense, and not white or grey, but glaucous dull smoky green, appearing smooth, yet clothed like the st. upwards and the petioles with fine short close-set or distant adpressed white and silky hairs. Stip. nearly sessile leaf-like subinequilateral broader than long often emarginate at the base. Petioles about two lines long. Lfts. roundish-obovate or obcordate 1–2 lines long, 1–1¾ broad; petiole or common footstalk 1½–3 lines long. Fl. very large often an inch long, always solitary cernuous or even pendulous on short jointed rounded axillary ped. 2 or 3 lines long, scentless, often dull purplish even in the bud, but mostly at their first expansion pale sulphur or pale greenish-y., streaked or tinged more or less with dull brownish purple, with a blackish purple patch at the base of the standard, and the tip of the keel always dark purple. As it fades the whole fl. becomes first brownish, then more or less dark purple or blackish. There is usually a stalked 1–3-foliate br. at the joint or base of pedic. Cal. large pale gr. pubescent; teeth ⅔, long linear acuminate nearly equal in length, the two upper broadest; the 4 upper ascending, the lowest straight. Pet. not loose and flaccid as in *P. glauca,* but compact and close, altogether concealing the stamens and style. Wings as long as standard, closely embracing the remarkably long purple-beaked keel, uniform pale sulphur. Stam. diadelphous 9|1 the 9 combined into a smooth silvery-whitish sheath; fil. unequal, the longer dilated upwards and often barren. Ov. hairy chiefly along the upper suture, soon becoming smooth. Style as long

as ov. round slender smooth, giving off from its upper side a little below the thickened tip a short distinct straight slender branch or tooth. Pods mostly 2 in. long, $\frac{1}{10}$ in. thick, perfectly straight and cylindric, tipped with a short curved point, quite smooth, shining dark brown or black, erect or spreading not deflexed or drooping, divided within into as many cells as seeds by numerous regular transverse membranous dissepiments; very rarely here and there strangulate or torulose. Seeds very small, one millim. in diam., 30–40 in a full-sized 2-inch pod, orbicular compressed, perfectly smooth and even, appearing to the naked eye dark brown, but through the lens tawny or dark yellowish mottled with black specks and dots.

Usually more erect or bushy and always less grey or hoary than *P. glauca* (Ait.), with a wholly different habit, owing to its delicate minute thin foliage, and shorter stiffer branches not interlacing into tangled matted beds or tufts.

5. P. ARGENTEA Lowe.

Suffrutescent *silvery-white or grey and softly silky-villose or hirsute*; st. elongated woody *stout and stiff* prostrate or procumbent; stip. shortly stalked roundish-oval; l. very distinctly stalked, lfts. large *obcordate or obovate-wedgeshaped retuse mucronulate*; fl. solitary very rarely binate on short stalks with a large leafy 3-foliate br. *or subsessile*; pods distinctly stalked *long straight evenly cylindric more or less hairy* many-seeded; seeds 12–50 a little larger than in *P. macrantha*.—Hook. J. Bot. viii. 293.—$\frac{\text{Shr}}{2}$ subper. PS. reg. 4, rrr; ND. r; SD. reg. 2, $\frac{r}{2}$. PS., rocky summit of Pico do Facho, N. side. ND. at the top, under the low central ridge or bank of rocks running northwards immediately beyond the ruined house. SD. at or near the top on the W. side or edge of the cliff. April–July.—Very different in aspect and habit from *P. macrantha*, altogether coarser and stouter with large silky densely hairy silvery foliage, and comparatively stout stiff woody branches, though the pl. is of scarcely more than annual duration. Branches long straggling procumbent or diffuse distinct not crowded and thus rarely cespitose or bushy; silvery and silky-hairy. Petioles rather long (2–3 lines) distinct; lfts. sometimes $\frac{1}{2}$ in. long and $\frac{1}{3}$ in. broad at top, bluntly rounded, more or less retuse often mucronate, thickly clothed and almost shaggy with white adpressed silky hairs. Stip. the same but shorter and cordate-oval or rhomboid. Fl. rarely more than half the size of those of *P. macrantha*, and mostly altogether dark dull mulberry-juice- or claret-purple, rarely pale greenish-lemon. Teeth of the cal. (in the fl.) $\frac{2}{3}$, longer than the tube linear-acuminate or subulate nearly equal in length broader in fr. Style long, persistent, with a very

distinct parallel straight tooth or rather fork towards the end. Pods $\frac{1}{10}$–$\frac{1}{8}$ in. thick and sometimes $1\frac{1}{2}$–2 in. long, but mostly about half the length of those of *P. macrantha*, which they resemble otherwise in all respects. Seeds perhaps a little larger than in that sp., viz. $1\frac{1}{2}$ millim. in diam., but otherwise the same.—A very distinct sp., most resembling *Lotus creticus* L., which is however not a true *Pedrosia*.

States of this pl. undoubtedly occur which appear in some points intermediate, and may seem to pass into *P. macrantha*,—having less shaggy silky foliage, and forming (as at the top of SD. in July 1849) large matted beds like *P. glauca*. Such are perhaps hybrids. But on the humid cold N. side of the rocky summit of P. do Facho in PS., bathed in almost constant cloud and moisture, *P. argentea* and *P. macrantha* are found growing intermixed, each in its extremest form of character, viz. with large silky-hirsute, and minute nearly smooth lfts.,—thus proving themselves to be at least no mere local varr. of a single sp. And if the occasional occurrence of an intermediate form be held fatal to the constitution of a sp., there will remain few indeed in other genera than *Lotus* or *Pedrosia* that will stand the test.

6. P. Loweana (Webb).

Suffrutescent *silky white or silvery-grey profusely leafy*; st. diffuse or prostrate woody slender flexible; l. stalked; lfts. and stip. alike *linear-lanceolate acute* densely silky-hairy; fl. *solitary axillary sessile subspicate towards the ends of the branches*; pods *villose very short* scarcely longer than the *enlarged persistent* villose equally 5-partite cal. *few-seeded* linear straight moniliform or strangulate, the joints globose; seeds 2–6 subglobose.—*Lotus Loweanus* WB. ii. 87. *Pedrosia Porto-sanctana* Lowe in Hook. J. Bot. viii. 293.—$\frac{\text{Shr}}{2}$ per. PS. reg. 1, 2, cc. Sea-cliffs and rocky slopes or hill-sides near the sea almost everywhere in PS., especially near the town. April–June.—Per. and more suffruticose in habit than any of the preceding sp. Branches numerous from the crown of the root, spreading prostrate or diffusely suberect and then distichously branched and elegantly feathery or drooping, round and faintly striated, 6–18 in. long. Whole pl. thickly leafy clothed with soft dense silky silvery adpressed pubescence, except the cal. which are quite villose with spreading hairs. L. all stalked; stip. and lfts. of same size and shape, 3–5 lines long and 1–$1\frac{1}{2}$ broad. Fl. dark dull blackish purple, not altogether small but inconspicuous and buried in the foliage, not longer than the l., uniformly solitary and sessile in the axils towards the ends of the branches. Cal.

large campanulate 5-fid, its teeth 3 times the length of its tube linear equal erect or ascending villose nearly as long as the fl. Cor. rather small scarcely exceeding the cal.; standard and wings blackish purple shorter than the narrow acuminate keel which is greenish lemon-col. more or less black or streaked with black. Stamens diadelphous 9|1. Style smooth upwards with a short straight fork or tooth below the distinctly capitate stigma. Pods most like those of *P. glauca* but only $\frac{1}{4}$–$\frac{1}{2}$ in. long and 1 line broad, often shorter than the sep. and concealed within the cal., clothed like the cal. with thick w. shaggy hairs, strongly moniliform or strangulate, divided internally by complete transverse *septa* into as many distinct cells as there are seeds or turgid globose joints, not however separating across between the joints but bursting as usual longitudinally into two valves, each divided into cells by the halves of the *septa* which split each into two parts. Seeds oval-globose brown quite smooth and even.

Exclusively, apparently, a Porto-Santan pl., discovered first in 1828 in company with Webb, but laid aside for many years in order to establish, by comparison with other cognate genera and sp., the claims to generic distinction from *Lotus* which, from the first, I believed it to possess.

Scarcely three months after its publication (Oct. 1856) under the name of *P. Porto-sanctana* in the J. of Bot. seeing for the first time a copy of vols. ii. and iii. of Webb's Phytogr. Can., it was at once apparent that the pl. had been previously described from PS. specimens, gathered with me in 1828, under the name of *Lotus* (*Heinekenia*) *Loweanus*, by the excellent and amiable author of the 'Canarian Flora.' His specific name possesses therefore a clear right of priority. I only regret unfeignedly that *Heinekenia* has no such claim for adoption, having been imposed by him on an illconstituted section merely of *Lotus*, embracing only one (the present) true *Pedrosia*, and not being in any way correlative with that generic group, to which indeed his other section, *Etymolotus*, rather corresponds, though not defined by any clear invariable or important character.

†††Tribe V. *Galegeæ*.

†††14. ROBINIA.

False Acacia.

†††R. PSEUDACACIA L. **American Locust-tree.**

Branches smooth mostly armed with a pair of small strong

stipulary spines at base of petioles ; lfts. oblong-oval or elliptic ; rac. drooping and with the pods smooth.—Brot. ii. 486 ; DC. ii. 261.—Tr. per. (l. deciduous) Mad. reg. 1, 2, c or $\frac{c}{2}$. In public walks and gardens chiefly about Funchal, the Mount, Camacha, &c. March, April.—A tr. 30 or 40 ft. high with deciduous odd-pinnate l. of 5–10 pairs of rather large stipelled smooth lfts. 1–1½ in. long, ½–¾ or 1 in. broad, and lax drooping short rac. of pure w. fragrant fl. appearing in early spring before the l. and perfuming the air in their neighbourhood. Bearing the sea air better than most tr. in Mad., it is well adapted for planting near the beach ; but affords rarely more than a scanty shade. Though its roots run generally near the surface, throwing out frequent suckers, it shows no disposition to become truly naturalized in Mad.

A few tr. of *R. dubia* Fouc., DC., with pale blush-pink fragrant fl. formerly existed about the Quinta do Valle ; and *R. hispida* L., a shr. with hispid st. and rac. of deep-rose-purple scentless fl., also occurs sometimes in gardens.

Tribe VI. *Hedysareæ.*

* Fl. umbellate. *L. odd-pinnate.*

15. Arthrolobium Desv.

1. A. ebracteatum (Brot.).

L. all pinnate; lfts. elliptic-oblong in 3–7 lax or distinct pairs, equal, the lowest remote from the st. ; stip. minute indistinct ; ped. about as long as the l. mostly 2–3-fld. ; pods falcate slender filiform.—" Desv. Journ. Bot. 3. 121, t. 4. f. 10 ;" EBS. t. 2844 ; Bab. 86. *Astrolobium ebracteatum* DC. ii. 311 ; Seub. Fl. Azor. 49. no. 390. *Ornithopus ebracteatus* Brot. ii. 159 ; Brot. Phyt. Lusit. i. 168, t. 68 ; Spr. iii. 325 ; WB. ii. 117.—Herb. ann. Mad. reg. 2, 3, ccc ; reg. 1, occasionally. Mountain pastures, especially near rills or water-courses, everywhere. At the mouth of the Rib. da Janella near the sea. May–July.—Nearly or quite smooth and of a full or darkish gr. ; sometimes a little puberulous upwards. Root with several knobs or tubers at the crown. St. 6–12 in. long numerous spreading all round prostrate filiform straight rather stiff and hard mostly reddish or purplish. Lfts. in about 6 pairs distant and distinct, each 3 or 4 lines long and half as broad. Stip. very minute and inconspicuous adnate to the petiole, obsolete or wanting altogether in the upper l. Ped. slender filiform 1–2 in. long 1–4-fld. without any l. or lft. at the top. Cal.-teeth many times shorter than the tube, triangular-ovate. Fl. small golden-y. inclining to or. Pods very smooth and shining mostly

reddish or purplish before ripe, very narrow and slender almost filiform, an inch or more long and only ½ a line broad falcate of equal curvature throughout, nearly cylindric or only slightly compressed, and even or scarcely perceptibly strangulate or torulose, minutely punctato-rugulose, with a slender acuminate more or less hooked beak.

Mr. Babington in EBS. t. 2844 refers to "Koch. Syn. 189," meaning his 1st ed., for the pl. is omitted altogether in his 2nd.

16. Ornithopus L.

1. O. perpusillus L.

Ped. about as long as the l. mostly 2–3-fld.; cal.-teeth ovate 2–3 times shorter than tube; pod slender narrow compressed erect arched or curved upwards, distinctly jointed or moniliform, beak straight shorter than the topmost fertile joint.—Desf. ii. 172; EB. t. 369; Buch! 197. no. 396; DC. ii. 312 (excl. var. β); Sm. E. Fl. iii. 290; Koch 209; Bab. 86.—Herb. ann. Mad. reg. 2, 3, c. Grassy banks in chestnut woods and mountain pastures almost everywhere above 2000 ft., e. g. up the Caminho do Meio, at or above Camacha, Paul da Serra at the Chão de Madeira, &c., and abundant in chestnut woods about the Jardim da Serra. May–July.—An inconspicuous but elegant little pl., not easily discernible in the short mountain turf of which it is however in most places a constituent. Whole pl. pubescent. St. 3–12 in. long prostrate or procumbent slender straight and stiffish. Lfts. in 5–12 or even 2 or 3 more pairs, small 1–2 lines long, half as broad oval or elliptic rather close or crowded, the lowest pair in all but the root-l. close to the st. Stip. very small and indistinct adnate to the petiole. Ped. 1–4-fl. slender filiform ¼–1½ in. long with a sessile pinnate l. at top. Fl. very small white elegantly painted within with bright crimson and y. lines or dashes. Cal. pubescent the teeth short triangular-ovate. Pods pubescent ½–¾ in. long, 1 line broad, slightly curved upwards throughout their whole length, distinctly constricted between the joints; when riper or dry elegantly wrinkled or striate longitudinally. Joints oblong-oval truncate at each end. Beak straight short.

O. sativus Brot. (*O. roseus* Dufour, *O. perpusillus* β DC.) with cal.-teeth linear-subulate as long as the tube, and rather longer straighter or quite straight inclining or pendulous pods with a beak as long as the topmost joint, should be looked for in Mad., occurring as it does both in Portugal and (Seub. Fl. Azor. 49) in the Açores.

2. O. compressus L.

Ped. shorter than the l. mostly 2–3-fld.; cal.-teeth linear-

subulate nearly as long as tube; pods large broad and flat declining or pendulous scimitar-shaped or hooked downwards only towards the tip, distinctly jointed or moniliform; beak hooked, as long as or longer than the topmost joint.—Desf. ii. 172; Brot. ii. 159; Buch! 197. no. 397; Fl. Gr. t. 714; DC. ii. 311; WB. ii. 117.—Herb. ann. Mad. reg. 2, 3, ccc. Sunny open spots and mountain pastures everywhere. Waste ground about Funchal, at Camacha, &c. April–June.—Altogether hairy or pubescent, and of a peculiar somewhat pale or hoary light apple-gr. St. numerous from a radical tuft of l. prostrate or procumbent 6–18 in. long spreading all round stout straight and stiff. Lfts. numerous in 10–20 pairs crowded and close together larger than in *Arthrolobium ebracteatum* DC.; the lowest pair in the upper l. close to the st.; in the lower l. oval, in the upper elliptic; all acute or mucronulate. Ped. 2–5-fl. short with a sessile pinnate l. at top beneath the umbel. Fl. small, the same size as in *A. ebracteatum* DC. but clear y. approaching to lemon. Pods much compressed 1–2 in. long, 1½–2 lines broad, straight below, strongly hooked towards their point, finely pubescent, distinctly constricted between the joints which are oval and truncate at each end: when ripe or dry longitudinally striate.

17. Hippocrepis L.

§ Annual. Sinuses of pods circular or nearly closed.

1. H. multisiliquosa L.

Ped. about the length of or a little shorter than the l. mostly 4–6-fl.; pod arcuate or circularly falcate with deep horse-shoe-shaped sinuses opening on the convex edge, hispid-echinulate over the horse-shoe-shaped seeds and minutely glandular-ciliate irregularly at the upper convex edge.—Desf. ii. 175; DC. ii. 312; WB. ii. 118; Fl. Gr. t. 717; Moris Sard. i. 543. t. 66.—Herb. ann. Mad. reg. 1, rrr; PS. reg. 2, r. Brazen Head, Mad., outside the rocky hummock; hill-sides in PS. here and there towards the sea. April, May.—Nearly smooth and shining, only here and there slightly puberulous. Cotyledon-leaves long linear. Root nearly simple white. St. several 6–12 in. long sometimes erect mostly procumbent or diffusely spreading straight angular strongly ribbed or striate shining reddish or purple. L. dark full gr. 1½ in. long; lfts. of lower l. in 2 or 3 pairs broad oval, of upper in mostly 5 pairs with an odd one narrow elliptic about ⅓ in. long slightly retuse mucronate, beneath like the short leafstalks, ped., and st., subpuberulous. Ped. usually nearly or quite the length of the l. sometimes shorter 2–6-fl. Fl. rather small bright golden y., standard a little streaked outside with reddish-purple. Pods of a very singular and beautiful form, an in. or more long, ⅕ in. broad

very flat and thin, curved almost into a circle, with large circular or horse-shoe-shaped sinuses at regular distances on the convex upper side, hispid or muriculate-scabrous with dense short erect glandular spinules or bristles all round the sinuses where the seeds lie arching round them, and indistinctly ciliate with very short tubercular or glandular pale points at the opposite or upper convex excised edge, which is also red or purplish before maturity. When ripe the whole pod is reddish-brown. Seeds brown smooth shining angularly compressed slender horse-shoe-shaped curving semicircularly round the sinuses.

** Fl. umbellate. *L. simple.*

18. SCORPIURUS L.

1. S. SULCATA L.! *Cabreira.*

Nearly or quite smooth; ped. longer than the l. 1–4-fl.; cal.-teeth ovate-triangular shorter or not longer than the tube; pods armed loosely curled downwards, the volutions distinct or distant unentangled and nearly in the same plane, ribbed lengthways, the inner ribs unarmed, the 4 outer armed with distinct not crowded bristly spines with slightly hooked points. —Desf. ii. 174; Buch! 197. no. 398; DC. ii. 308; WB. ii. 115. *S. subvillosa* Holl's List! in J. of Bot. i. 20 (not Linn.). *S. echinata* var. *sulcata* Brot. ii. 79.—Herb. ann. Mad. reg. 1, 2 (principally 1), ccc; PS. reg. 1, 2, 3, ccc. Waste ground, borders of cornfields and road-sides Mad. everywhere; in PS. up the P. do Castello, P. d'Anna Ferreira, in the Serra de Fora, &c. Feb.–May.—St. prostrate, the ends ascending, rather stout and stiff, pale gr. L. dark shining gr. very variable in size and shape mostly subspathulate-lanceolate acute, much attenuated downwards into the long narrowly winged or margined petiole, ribbed not veined from 2–6 in. (with petiole) long and $\frac{1}{4}$–$1\frac{1}{4}$ in. broad. Ped. 1–5 or 6 in. long axillary 1–4- mostly 1-, rarely more than 2-fl. Fl. small bright full y. Cal.-teeth broad and short acute. Pods mostly reddish scarcely so thick as a crow-quill, irregularly waved and spiral in one plane, contracted between the seeds and thus singularly flexuose or wavy in short arches, armed with 4 rows of very unequal spines or bristles often a line long on their upper or outer convex dorsal side.

The true *S. subvillosa* L.! (*S. sulcata* Fl. Gr. t. 719 not Linn.!) distinguishable, as well observed by Boissier, by its pods being from their earliest stage strongly and irregularly curled or twisted into a confused closely entangled mass, has not hitherto occurred in Mad. Webb however records it as a Canarian pl., and I have, I believe, myself collected it in Palma.

2. S. VERMICULATA L.!

Hirtosely pubescent or subvillose; ped. 1–2-fld.; cal.-teeth ovate-acuminate or lanceolate longer than the tube; pods smooth closely curled thick unarmed, the 10 outer ribs warted with stalked clubshaped crowded close-set tubercles.—Brot. ii. 79; DC. ii. 308; WB. ii. 116.—Herb. ann. Mad. reg. 1, r. Edge of the sea-cliff halfway between Funchal and the Brazen Head (Dr. Lemann); Caniço (S. Moniz); to the W. of Funchal at top of some rocks halfway between the little Crater and the E. end of the Praia Formosa; between Machico and Caniçal abundantly. April, May.—Larger coarser and ranker than the usual states of *S. sulcata* L., and always subvillose or softly hairy-pubescent, scarcely shining. St. 1–2 ft. long. L. as in *S. sulcata* L., but light apple-gr. and slightly hoary. Fl. much larger and mostly solitary rarely 2 together, or. not y. Cal.-teeth longer and narrower than in *S. sulcata*. Pods very curious, large or thick, shorter and of fewer volutions, but these more closely rolled together and ¼ in. in diam. or as thick as a large goose-quill, contracted between the seeds, of a singular pale whitish spongy appearance, and most curiously covered with close-set stalked wartlike or scale-like tubercles, each resembling in miniature a conical nail-head or the *pileus* of a *Leotia* or *Helvella*.

Tribe VII. *Astragaleæ*.

19. BISERRULA L.

1. B. PELECINUS L.

The only known species.—Brot. ii. 170; Novit. 23 or 545; WB. ii. 96.—Herb. ann. Mad. reg. 1, r; PS. reg. 2, 3, 4, c; ND. r; SD. reg. 2, r. March–June.—St. prostrate or procumbent from 6–18 in. long, lying usually quite close to the ground and often thickly matted, sparingly branched, elongate slender leafy. Whole pl. pale dull gr. almost hoary, with the habit somewhat of an *Ervum*. Lfts. small, in many (about 10) distinct or subremote pairs, widely notched as if they had been doubled together and their ends cut off obliquely rather than obcordate, the lobes being acute not rounded; the midrib forming a minute point or mucro in the middle of the notch. Fl. small inconspicuous very pale greyish-b. or almost white, 2–4 together in a short-stalked umbellate rac. Cal.-teeth long subulate setaceous. Pods drab-brown pendulous large broad flat and very singular from their regularly large-toothed edges or rather sharply-keeled backs, being flattened or compressed in a contrary direction to that of most leguminous pl. *i. e.* from suture to suture; they are ½–2 in. long and ¼–⅓ in. broad, and about 14-seeded, the seeds in 2 rows of about 7 each. Var.:

a. pubescens Novit. l. c. ; wholly pubescent. — *B. Pelecinus* Desf. ii. 190 ; Fl. Gr. t. 737 ; DC. ii. 307.—On the Brazen Head outside the hummock, and at the Piedade, Caniçal, ascending from the sandy beach. Top of N. Deserta near the ruined house. Top of SD. In P^to^ S^to^ general in waste ground, cornfields, on sunny slopes of hills by road-sides, &c., from the sea-cliffs up to the very summits of P. d'Anna Ferreira, P. do Castello, &c. here and there.

β. glabra Novit. 24 or 546 ; WB. l. c. ; wholly smooth.—rrr. Only on the Brazen Head, Mad., growing intermixed with *a*, and without intermediate forms. Yet, except in the entire want of pubescence in every part, there is no essential difference at all between the two,—*a* being all over hairy, almost hoary, in every part, with the midrib of the pods usually dark purple or v. ; *β* quite smooth in every part, with the midrib of the unripe pods gr. like the rest. In size or luxuriance, as in size and colour of the fl. the two entirely agree.

20. ASTRAGALUS L.

§ OCHROLEUCI *Bucerates* DC. Stip. free distinct, fl. y. or yellowish, pods often hooked, root annual.

1. A. SOLANDRI Lowe.

Herbaceous ann. villose-pubescent ; st. procumbent or diffuse; stip. free distinct; lfts. in mostly 10–12 crowded pairs oval or elliptic-oblong notched or retuse smooth above, hoary-grey and hairy or villose beneath ; ped. many-flowered elongate as long as or somewhat longer than the l. ; pedic. in fr. deflexed ; pods pendulous slender falcate acute compressed trigonal widely and deeply channeled at the back, closely strigose-pubescent.—Hook. J. of Bot. viii. 294. *A. canescens* Sol. ! in BH. ; Buch ! 197. no. 399 ; Prim. 34 (not DC.). *A. hamosus* Sibth. Fl. Gr. t. 728 (not Linn. !).—Herb. ann. Mad. reg. 1, rrr. PS. reg. 2, 3, c. P^ta^ S. Lourenço on the Ilheo dos Embarcadores, first observed by the Rev. Marwood Tucker, 1838. PS. sunny rocky slopes and hill-sides, general. April–June.—Very variable in size and luxuriance.—Root small nearly simple tapering white a little woody. From its crown spring several slightly flexuose st. which are sometimes nearly upright but mostly at first more or less prostrate then ascending, from 2 or 3 to 12 or 18 in. long. Whole pl. hoary dull gr. and clothed in all parts except the upper surface of the lfts. with copious white adpressed shaggy but not long hairs. Stip. ovate-lanceolate acuminate, free and distinct from the petiole, but often more or less combined with each other round the st., placed as usual one on each side the base of the petiole. Lfts. in from 10–14 seldom fewer than 5 or 6 pairs becoming gradually smaller from the base upwards, 3–7

lines long, 1–3 broad. Fl. rather small pale or greenish y.; rac. shortly oblong dense, mostly from 10–15- not often less than 5- or 6-fld., on erect axillary ped. 2–4 or 5 in. long produced throughout the whole length of the st. Bracts small lanceolate membranous deciduous. Cal. and rachis clothed with brown and black hairs. Cal.-teeth linear-lanceolate shorter than the tube. Pods about 1 in. long, $\frac{1}{8}$ in. broad, strongly hooked or sickle-shaped, 3-sided but distinctly compressed, with a deep *broad* furrow, having prominent raised margins, on their convex side or back, clothed in all stages with short closs-pressed bristly hairs, pale gr. or yellowish, but when fully ripe pale brown and splitting open along their concave side. Seeds compressed dark olive-y.; radicle prominent.

Varies greatly in habit and luxuriance, being sometimes quite prostrate, with st. not above 2 or 3 in. long, and sometimes a foot high or more and bushy, with upright or diffusely speading branches. It differs from the true *A. hamosus* L.! (Herb. Linn.!) in the smaller (shorter and narrower) compressed trigonal (not terete or cylindric) widely channeled and in all stages (adult as well as young) adpressedly strigose-pubescent pods, in the smaller more crowded lfts., the hoary villose foliage, and free distinct not oppositifolious stipules. Nor are the lfts. cuneate or obovate, or the ped. shorter than the l. On the other hand the Canarian pl. *A. hamosus* *a* and *β* WB.! ii. 93, 94, formerly confounded with the present by myself and Webb, proves by examples gathered recently abundantly in Lanzarote, Fuerteventura, Hierro, and Gomera by myself, to be the true *A. hamosus* L. Herb. Linn.!

†2. A. BÆTICUS L.

Herbaceous ann. inconspicuously pubescent; st. procumbent or diffuse; stip. free distinct; lfts. in 10–15 pairs oblong or linear-oblong truncate or retuse smooth above; ped. few-flowered short, much shorter than the l.; pods erect straight oblong short and thick three-sided subcompressed broadly channeled on one side, beaked with a hooked point at the tip; dorsal suture and edges of channel tumid thickened.—Desf. ii. 184; Brot. ii. 167; DC. ii. 291; WB. ii. 94; Fl. Gr. t. 730.—Herb. ann. Mad. reg. 1, rrr. Brazen Head, only on the steep sunny western slopes of the extreme point in a strong clay soil, where it is perfectly naturalized, though doubtless originally a mere straggler, or the remains of cultivation on the spot. It has not been met with either wild or cult. elsewhere in Mad., though probably, from its luxuriance in this exposed and arid situation, it might prove in similar places an exceedingly valuable re-

source for fodder, if cult. as a crop. First noticed by the late Dr. C. Lemann, then by myself, and again, after many years, recently by the Barão de Paiva and S^r^ Moniz. March, April.—A large coarse straggling branched copiously leafy pl. with dark-gr. foliage. St. 1–2 ft. long stout and robust round striate often purplish. Stip. free from the petiole but partially combined with each other round the st., membranaceous ovate acuminate. L. 5 or 6 in. long; lfts. ½–1 in. long, 2–3 lines broad, quite smooth above, adpressedly pubescent beneath like all the rest of the pl. Fl. ochroleucous pale very small and inconspicuous crowded in small 2–6-flowered shortly stalked spikes. Cal. clothed with black hairs; the teeth linear-subulate as long as the tube. Peduncles angular erect about 1 in. long, in fr. 1–2 in. solitary. Standard pale dull greenish-y. much longer than the wings which again are longer than the keel. Pods 1 in. long, ¼ in. broad, short thick oblong prismatic subcompressed and hollow or broadly channeled on the outer or lower inflexed suture-side, shining though finely adpresso-pubescent; when ripe becoming roughish, especially along the rounded thickened or tumid edges of the channel, and of a pale light yellowish colour, with a short strong sharp hooked beak. Seeds 4 in each cell large squarish much compressed with a strong notch or sinus at the *hilum*, pale brown or tawny-y. smooth.

Tribe VIII. *Vicieæ*.

†††21. CICER L.

†††1. C. ARIETINUM L. *Grão de bico.*

Glandular-pubescent; l. mostly odd-pinnate; lfts. in many pairs ovate-lanceolate sharply serrate equal; stip. ovate coarsely and irregularly toothed; cal. but slightly gibbous at the base, its teeth as long as the wings of cor.—Desf. ii. 168; Brot. ii. 165; Buch! 197. no. 394; BM. t. 2274; DC. ii. 354; Koch 212; Wight Ic. Pl. Ind. Or. 1. t. 20.—Herb. ann. Mad. and PS. reg. 1, 2, c. Amongst corn and in waste ground here and there occasionally; towards the Praia, to the E. of Funchal, &c. Frequently cult. as a crop. April, May.—Sparingly branched and chiefly from the base, the branches distichous or spreading in one plane, 12–18 in. long; the l. also regularly distichous and without tendrils, rendering the habit altogether peculiar. Whole pl. dark gr. glandulose-pubescent and with an acid taste when applied without bruising to the tongue. Lfts. ovate oblong or elliptic acute at both ends sharply and strongly serrate. Stip. ovate strongly sharply and coarsely toothed. Ped. 1-fld. very much shorter than the l. 2-bracteolate at top. Fl. solitary moderately large about 5 lines long dull purple with darker veins,

often creamy-white in the Canaries but not observed to be so in Mad. Pedic. as long as ped., in fr. abruptly deflexed at juncture with ped. Sep. linear-lanceolate twice as long as tube. Pods 1–1½ in. long very short and turgid rhombic-ovoidal velvety-pubescent pale gr. or yellowish when ripe. Seeds 2 large (size of marrowfat peas) pale y. ovate gibbous obtuse rudely resembling a ram's head; when boiled hard and flavourless, but considered the best of the various kinds of field pulse cultivated by the Portuguese, and forming a frequent ingredient in their "Sopas." In the Canaries, under the name of "Garbanzos," they are almost a universal adjunct to the "Puchera," that *sine qua non* of a Spanish dinner.

22. Ervum L.

§1. *Lens* Ser. in DC.; pods slightly turgid short broadly oblong 2-seeded.

†††1. E. Lens L. *Lentilha*, Mad.; *Ervilha* PS.

Erect branched bushy pubescent; lfts. linear-oblong in mostly 4–5 pairs with simple unbranched not prehensile tendrils; stip. ovate or linear-lanceolate entire ciliate; ped. 1–3-fl. awned nearly as long as the l.; sep. linear-subulate equal as long as or longer than cor.; pod short broad subtruncate smooth and even, 2-seeded; seeds compressed lens-shaped smooth.—Desf. ii. 167; Brot. ii. 152; DC. ii. 366; Koch 219; Seub. Fl. Azor. 49. no. 383. *Lens esculenta* Moench, WB. ii. 97.—Herb. ann. Mad. reg. 1, ½; PS. reg. 2, 3, ccc. Cult. as a crop amongst corn about the Piedade on P^ta^ S. Lourenço in Mad.; above the town beyond the windmills towards the Fonte d'Arêa and almost everywhere in PS. April, May.—A small erect bushy leafy pl. 6 or 8. in. high with small light or y.-gr. foliage. Whole pl. except the pods slightly hairy. L. short ¾–1 in. long. Tendrils very fine and filiform ¼–¾ in. long straight or slightly curling, not prehensile, reduced on the lower l. to a short awn or point. Lfts. 2–6 pairs, 2–5 lines long 1–2 broad truncate or retuse mucronulate, the uppermost linear-acute. Ped. mostly 2-fld. Fl. small inconspicuous 2–2½ lines long light bluish; cor. not longer than sep.; standard blue upwards with darker streaks or lines. Style upwards sparingly puberulous only along the upper side. Stigma capitate. Cal. and sep. hairy, the latter very long and narrow linear and finely acuminate of equal length 5 or 6 times longer than the very short tube. Pods pendulous subrhomboidal compressed somewhat turgid quite smooth pale yellowish brown or fawn-colour when ripe, 5–6 lines long, 3 broad, rarely 1-seeded. Seeds rather large (2 lines diam.) orbicular sharp-edged perfectly smooth and even, dark reddish-brown; *hilum* very small and narrow linear short.

Grown amongst corn (wheat, rye, or barley) as clover in England. When ripe the whole pl. is pulled up by the roots and dried in bundles. The ripe seeds are a favourite pulse with the poor.

2. E. PARVIFLORUM (Loisel.).

Climbing branched rampant subpubescent; lfts. in mostly 5–7 pairs but often irregularly alternate especially downwards linear-oblong or elliptic distinctly mucronate; the tendrils branched prehensile twining; stip. half-arrow-shaped linear-lanceolate; ped. 2–3-fld. awned shorter than the l.; sep. unequal linear-lanceolate finely acuminate shorter than cor.; pod short broad obliquely truncate smooth and even, subpuberulous only at the upper edge, 2-seeded; seeds compressed globose minutely scabrous.—"*Vicia parviflora* Loisel. (not Mich.)." "*Ervum parviflorum* Bertol.;" Moris Sard. 1. 570, t. 71. *Vicia disperma* DC. ii. 359; WB. ii. 101.—Herb. ann. Mad. reg. 2, rrr. Along the Levada de Bom Successo up the Caminho do Meio, in the Rib. de João Gomes in waste rocky places or bramble-hedges amidst cult. ground. March, April.—Most like *E. hirsutum* L. in habit and fl., but lighter gr. with large smooth pods like *E. Lens* L. St. branched ribbed and angular climbing and entangled amongst other pl. or bushes. Lfts. 2–5 lines long, 1–1½ broad, mostly acute at each end, often obtuse, always distinctly mucronate, in 4–8 pairs but set very irregularly on the rachis. Fl. 1–4 very small 2 lines long scarcely larger than those of *E. hirsutum* L., pale grey or bluish, the keel tipped with v.-black. Cal. and sep. hairy; the latter unequal, the 2 uppermost broadest and shortest subtriangular or semi-ovate-lanceolate converging, the 2 side ones rather narrower and longer, the lowest narrowest (linear-subulate) and longest; all finely acuminate longer than the tube but shorter than cor. Style hairy all round upwards below the capitate stigma, not bearded. Pod large like that of *E. Lens* L., but rather longer and more obliquely truncate (not perfectly ripe in my spec.) 6–8 lines long, 3 broad, very flat and thin with always 2 prominent seeds, perfectly smooth and even, except along the upper fertile suture which is minutely subpuberulous, pendulous pale yellowish-brown or fawn-colour. Seeds (not quite ripe) a line or a tenth of an in. in diam. dark brown or blackish finely punctato-granulate or scabrous; *hilum* small.

This sp. much resembles in its pods and foliage *E. vicioides* Desf. ii. 168, t. 198. Its transfer from *Vicia* to *Ervum* permits, and indeed necessitates, recurrence to Loiseleur's original specific name, forestalled in *Vicia* by Michaud, as *dispermum* of DeCandolle is by Roxburgh or Willdenow in *Ervum*.

3. E. HIRSUTUM L. *Cigerão.*

Climbing branched rampant subpubescent; lfts. in mostly 6–8 pairs irregularly opposite often alternate linear-oblong or linear truncate or retuse mucronulate the tendrils branched prehensile twining; stip. linear-setaceous 2–3-partite; ped. 2–6-fl. awned shorter than the l.; sep. equal linear-acuminate shorter than cor.; pod more or less pubescent often almost velvety small oblong short compressed obliquely truncate 2-seeded; seeds prominent globose smooth.—EB. t. 970; Brot. ii. 152; Buch! 197, no. 393; Sm. E. Fl. iii. 289; DC. ii. 366; Hook. Fl. Brit. (ed. 5) 88; Koch 218. *Vicia hirsuta* WB. ii. 99; *a.* Bab. 81.—Herb. ann. Mad. reg. 1, 2, 3, ccc; ND. r; GD. r. A common weed in Mad. everywhere in waste ground, vineyards, cornfields, road-sides, &c. about Funchal, P^ta^ do Pargo, Cayados Ravine, &c. Jan.–June. —Branches slender entangled climbing thickly amongst herbage by the twisting branched tendrils. Lfts. dull gr. 2–3 lines long very variable in breadth, *i. e.* $\frac{1}{2}$–$1\frac{1}{2}$ line broad, truncate or notched mucronulate; stip. semisagittate, upper lobe lanceolate, lower in 2 or 3 linear setaceous segments. Fl. very small $1\frac{3}{4}$ or not quite 2 lines long, greyish nearly or quite white. Cal. and sep. pubescent, the latter straight equal linear finely acuminate longer than the tube, the 2 upper approximate. Style short stout subcapitate altogether smooth. Pods never in Mad. quite smooth mostly densely pubescent, scarcely above half the size of those of *E. parviflorum* (Loisel.), 4 lines long 2 broad, dark coffee-brown or black, very closely finely and minutely striolate obliquely. Seeds 2 rarely 1, protuberant large proportionately, 1 line in diam. globose slightly compressed smooth and even, fulvous or pale yellow-testaceous mottled with brown or black; *hilum* long linear equal to $\frac{1}{3}$ circumference of seed.

§ 2. *Ervilia* Ser. in DC.; pods linear-oblong 4–6-seeded.

†††4. E. ERVILIA L. *Marruiço* or *Marroiso*, i. e. ?*Marroio.*

Smooth erect branched from the base, branches stout straight simple; lfts. subpectinate linear or linear-oblong truncate or retuse mucronate in mostly 12–14 pairs, often irregularly alternate, without tendrils; stip. half-arrow-shaped lanceolate laciniately cut or toothed; ped. 2-flowered awnèd much shorter than the l.; sep. equal linear-subulate shorter than cor.; pod linear-oblong rather short and broad moniliform 2–4- mostly 3-seeded smooth; seeds very prominent large subglobose slightly angular smooth.—Brot. ii. 153; DC. ii. 367; Koch (ed. 2) 219. *Vicia Ervilia* Willd.; WB. ii. 100; Koch "(ed. 1) 192." *Ervilia sativa* Link sec. DC.—Herb. ann. Mad. reg. 2, r. Cult. as a crop in cornfields on the Cabo Girão towards the Pico do Rancho. May, June.—Forming a thickly matted or entangled

crop about 12 or 15 in. high. Whole pl. nearly or quite smooth, light gr. leafy with finely pectinate foliage. Branches numerous from the base, rarely or sparingly subdivided, firm erect strongly ribbed or angular, as thick as a crowquill, 9–12 in. long. L. $2\frac{1}{2}$–$3\frac{1}{2}$ in. long with numerous (8–16) pairs of narrow linear somewhat crowded pectinate lfts. 3–4 lines long and $\frac{1}{2}$–1 line broad, of which the lower and often all are placed very irregularly and alternately. Lower lobe and teeth of upper lanceolate part of stip. linear-setaceous. Tendrils reduced to a short simple awn. Fl. middle-sized 3–4 lines long pale rose-purplish, the keel tipped with w. Ped. not half the length of l. Cal. and sep. smooth or only puberulous, the latter long and subsetaceous longer than the tube. Style capitate sparingly pubescent upwards along the upper side only. Pod 6–8 lines long, $2\frac{1}{2}$ broad, pale yellowish or fawn-colour perfectly smooth and even, but curiously moniliform or strangulate from the very prominent large seeds, which are $1\frac{1}{2}$ line in diam. and of a reddish tile-colour. *Hilum* small oval.

†††5. E. MONANTHOS L. *Lentilha.*

Smooth climbing branched from the base, branches little subdivided rampant; lfts. linear or linear-oblong truncate or retuse mucronate in 5–7 pairs, the tendrils branched and twining; stip. dissimilar very unequal, one very small sessile simple linear-lanceolate entire, the other large stalked pedately fringed or ciliate with long subulate setaceous divisions; ped. 1-flowered nearly or quite as long as the l. mostly awned; sep. equal linear-lanceolate acuminate half the length of cor.; pods broadly oblong compressed torulose 3- or 4-seeded smooth; seeds prominent large orbicular compressed.—Brot. ii. 152; DC. ii. 367; Koch 219. *Vicia monanthos* Desf. ii. 165. *V. monantha* WB. ii. 101. *Vicia articulata* Willd.; Spr. iii. 267. *Lathyrus monanthos* Willd. Enum. (non Spec.) ex DC.—Herb. ann. Mad. reg. 2, $\frac{r}{2}$. Cult. as a crop in fields amongst corn to the E. of Funchal along the Caniço road beyond S. Gonçalo, and above the Brazen Head. April, May.—Wholly smooth; st. 1–3 or 4 ft. long scarcely branched except at the base, climbing thickly interwoven and entangled, especially when growing as a crop, by the mostly 3-cleft tendrils, stout striate or 4-angular with a strong rib up each of the 4 sides. Stip. very peculiar; the fringe-like laciniæ of the large stalked pedate one long and setaceous. Lfts. subremote in tolerably regular pairs, 4 9 lines long, 1–$1\frac{1}{2}$ broad. Lower ped. shorter, the middle about as long as the l. Fl. rather large 4–6 lines long mostly considerably larger than those of the next sp. (*E. gracile* Loisel.) pale bluish grey; standard with dark dull v. veins and tip of keel with a dark v. spot, the wings white. Cal. and sep. quite smooth, the latter straight and equal acuminate longer than the tube about half the length of

cor. Style slender capitate minutely puberulous upwards all round. Pods like those of the common garden-pea (*Pisum sativum* L.) but smaller, 1–1¼ in. long, ⅓ in. or 4 lines broad, quite smooth 2–4- mostly 3-seeded pale yellowish brown or fawn-colour. Seeds large 2½ lines or ⅕ in. diam. uniform velvety-black. *Hilum* small short linear white.

6. E. GRACILE (Loisel.). *Cigerão.*

Smooth or nearly so but occasionally subpubescent, branched climbing rampant; lfts. *linear* or linear-oblong *aeute cuspidate ereet in* 3–4 *pairs* but mostly placed irregularly or alternate, the tendrils *simple unbranehed* twining; stip. all semisagittate or hastate; ped. 1–4-*flowered longer than the l.*, often twice as long, awned; sep. *nearly equal short half-ovate or triangular shorter than their tube,* much shorter than cor., the 2 uppermost converging; pods linear or linear-oblong compressed subtorulose 6 *or 7-seeded smooth*; seeds globose even; *hilum* roundish-oval *small.*—"DC. Catal. Hort. Monsp. 109; Fl. Franc. v. 581;" Koch 219. *E. tetraspermum β. graeile* DC. ii. 367; Seub. Fl. Azor. 49. no. 384. "*E. tenuifolium* Lag., *E. tenuissimum* Pers. and *E. longifolium* Ten." DC. l. c. *E. varium* Brot. Phyt. Lusit. Fascic. 1 (1801) "no. 29;" Ejusd. Fl. Lusit. ii. 152; Welwitsch Fl. Lusit. exsicc. Sect. ii. no. 811 in BH. *Vicia graeilis* Loisel. Fl. Gall. ii. 148. f. 12; Koch (ed. 1) 192; EBS. t. 2904; Bab. 82. *V. laxiflora* Brot. Phyt. Lusit. Fascic. 1 (1816) p. 125, t. 52. *V. tetrasperma β. laxiflora* WB.! ii. 100.—Herb. ann. Mad. reg. 1, 2, 3, ccc; PS. reg. 2, 3, 4, c, or r/2; GD. reg. 2, c. Waste ground, vineyards, &c., a common weed about Funchal, and in ravines and thickets everywhere in Mad. Road-sides about Camacha, up P. do Facho and P. Branco, &c. in PS. Central valley, GD. March–June.—St. slender branched and climbing extensively amongst shrubs or herbage. Whole pl. slightly puberulous but apparently smooth, sometimes distinctly subpubescent, of a bright full gr. Lfts. commonly 5–10 lines long and linear or very narrow but variable in breadth, the lower especially, in luxuriant pl., sometimes half as broad as long, yet always acute and cuspidate, never blunt and mucronate. Ped. erect stiff slender 2–3 in. long, often, especially in fr., twice as long as the l. Fl. bluish-lilac 3–4 lines long i. e. larger than those of *E. tetraspermum* L. and twice the size of those of *E. hirsutum* L. Cal. and sep. subpubescent, the latter very slightly unequal short half-ovate or triangular-lanceolate, acute, the 2 uppermost broadest and shortest ascending and converging with their points mutually incurved, the 3 lower (especially the lowest) a little narrower and more lanceolate but very little longer, all shorter than the tube, scarcely (with tube) half the length of cor. Cor. 2–3 times length of cal. Style capitate subpuberulous upwards. Pods 6–7 lines long, 1½–2 broad, pale fawn-col., 5–8-

mostly 6–7-seeded. Seeds dark blackish-brown smooth even with a short rounded oval *hilum* not $=\frac{1}{10}$ circumference of seed.

Mr. Carruthers informs me that "in B.H. there is a spec. of *E. gracile* (Loisel.) from Jacquin, gathered in Languedoc, labelled in Jacquin's own handwriting:—'Ab *Ervo tetraspermo* differt seminibus pluribus quam quatuor, et foliolis acutis. Videtur nova *Ervi* species.' This shows that Jacquin first distinguished the species."

7?. E. PUBESCENS DC.

More or less pubescent rarely glabrescent, branched climbing rampant; lfts. *oblong rather short and broad* the lower oval, all *obtuse submucronate in* 5–7 *or* 8 *pairs, the tendrils branched* twining; stip. upper linear-acute, the lower semi-hastate; *ped.* 2–4-fld. filiform awned ("awnless" Gren. and Godr.) *shorter or scarcely longer than the l.*; sep. *distinctly unequal elongated-triangular* at length linear-subulate *longer than their tube* shorter than cor.; pods mostly *pubescent* linear-oblong 5–6-*seeded*; seeds globose even, *hilum* roundish-oval *small* $=\frac{1}{10}$ circumf. of seed.—DC. ii. 367 (not Tenor. or Loisel.); Gren. et Godr. Fl. Fr. 1. 474. "*Vicia tetrasperma* Moris Fl. Sard. 1. 567! (not Moench)" Gr. and G. l. c. *V. tetrasperma a.* WB! ii. 100 (not Moench, and excl. most of the syn.).

β. *glabrescens*; smooth except the younger portions of the pl. and cal.; ped. awned.—*Vicia gracilis* Sol.! MSS. in part, and BH.! quoad ex. ad sinistram schedæ "1. Madeira 1768, JB. and DS." inscriptum; Buch! 197. no. 390 in part also. *Vicia tetraspermum* Moench (Phytogr. Canar. 2. pag. 99) Teneriffe: in campis san Roque, Maio 1845, Bourgeau! Pl. Canar. no. 599 in BH. and HH. —Mad. Sir J. Banks and Dr. Solander, 1768: not observed more recently.

My sole authority for this as a Mad. pl. is the scrap referred to in BH. pasted by Solander on the same sheet with a spec. in fr. of *Vicia albicans* Lowe and marked as collected by himself and Sir Joseph Banks in Mad. A.D. 1768. It is Solander's original and principal type for his *V. gracilis*, though he described the pods of that pseudo-species from the other right-hand spec. of *V. albicans* Lowe. It is also the pl. mentioned by myself twice in Primit. (ed. 2) App. p. v. under the name of *E. hirsutum* L. as it had been inadvertently called by my friends Lemann and Bennett *in litt.* I had subsequently on personal inspection referred it to *E. gracile* (Loisel.); but I now acquiesce entirely in the

opinion of Mr. Carruthers that, notwithstanding some discrepancies, it belongs rather to *E. pubescens* DC. as described by Grenier and Godron. The following notes upon the spec. have been kindly furnished by Mr. C. :—

"Smooth except the cal. and young lfts. or rather all the younger portions of the spec. which are hairy. Tendrils branched. Lfts. 5–9 lines long × 1–2 broad oblong bluntish rounded slightly mucronate in 5–8 pairs. Stip. all semi-hastate, but the upper portions of the branches are wanting in the spec. Ped. 2?–4-fld. awned 1–2 in. long in fl., shorter than the l. Fl. with cal. 2 lines long. Cal. and sep. thinly hairy (pilose). Sep. elongated-triangular, at length subulate, with the edges ciliate; 2 upper about the length of tube, the 3 others much longer yet shorter than cor. Pods wanting in this spec., but in Bourgeau's no. 599, which there can be no doubt is the same sp., the pods are linear-oblong, covered with short scattered hairs, 5–6-seeded, and the seeds roundish with a rounded-oval *hilum* $\frac{1}{10}$ of their circumference."

The absence of pods in Solander's pl.—not to mention the general smoothness and awned ped. in both his and Bourgeau's spec.—invalidates of course the certainty of the foregoing determination, and consequently the claims of *E. pubescens* DC. to a place in the Mad. Flora. But, as Mr. Carruthers justly observes, "granting that Solander's spec. is a satisfactory *datum* for including a pl." otherwise unobserved "in the Mad. Flora, then, with the assistance of Bourgeau's Canary pl. (no. 599), which are undoubtedly the same sp., there can be no doubt that *E. pubescens* must have a place there." That the latter pl. has escaped the observation in Mad. of myself and other recent botanists is of little weight, considering its close resemblance to *E. gracile* and *E. tetraspermum*, and the fact of its having remained elsewhere so long confounded with those sp. It has proved to be however a Canarian sp.; and now that its characters are better understood, its detection in Mad. will it may be hoped soon follow, and establish, after nearly a century's obscurity and error, the correctness of Mr. Carruthers's determination of Solander's unique specimen.

MM. Grenier and Godron l. c. describe *E. pubescens* DC. as distinguished, "1st, from *E. tetraspermum* by its often more than 2-fld. ped., longer as many as 6-seeded pods, seeds with an oval-rounded *hilum* $\frac{1}{10}$ *their circumference*, and by the broader lfts.; 2ndly, from *E. gracile* by the more slender *awnless* ped. *scarcely longer than the l.*, by the generally smaller fl., the more unequal

cal.-teeth, by the oval lfts. of the lower l. and shorter much broader elliptic or oblong lfts. of the middle l., and lastly by its pliant (*molles*) flexuose stems; 3rdly, from both by the *linear-subulate* cal.-teeth *longer than the tube*, by its almost always pubescent rarely smooth pods, its linear-acute stip. the lower only being semi-hastate, and lastly by the numerous hairs covering the stems and l.—Pl. pale gr. varying much in the size and number of the fl."—Thus, with the pods and seeds of *E. gracile*, it has more the aspect, the fl., and shorter broader lfts. of *E. tetraspermum* L.

In the Canaries I have observed both *E. gracile* (Loisel.) and *E. pubescens* DC. (with shortly *awned or awnless* ped. and *altogether pubescent*), but not *E. tetraspermum* L.; and Mr. Carruthers and the Rev. W. W. Newbould assure me that Bourgeau's Canarian ex. both in BII. and HH. of his Pl. Canar. no. 599, "*Vicia tetraspermum* Moench (Phytogr. Canar. 2. pag. 99) Teneriffe: in campis san Roque, Maio 1845," are not, as I had hastily supposed, *E. gracile* (Loisel.), but certainly identical specifically with Solander's left-hand spec. of his *V. gracilis*, i. e. with *E. pubescens* DC. β.

8. E. TETRASPERMUM L.

Nearly or quite smooth branched climbing rampant; lfts. *linear-oblong* obtuse mucronulate in 3–5 or 6 pairs, the tendrils *forked or simple*; stip. semi-sagittate the upper sometimes simple linear-acute; ped. 1–2-fld. *filiform awnless as long as the l.*; sep. *very unequal shorter than the tube*, the 2 upper shortly triangular or half-ovate, all shorter than cor.; pods mostly smooth subcylindric 3–5-*seeded*; seeds globose even marbled or speckled, *hilum* linear-oblong *elongate* = $\frac{1}{5}$ circumf. of seed.—Desf. ii. 167 (in part); EB. t. 1223; Sm. E. Fl. iii. 288 (in part); Hook. Br. Fl. (ed. 5) i. 89; DC. ii. 367 (excl. var. β.); Koch 218; α. Gren. et Godr. Fl. Fr. 1. 474; Buch! 197. no. 392; *Ervum tetraspermum* L. var. latifolia, pedunculis unifloris—forte distincta species—Madeira 1777, Fr. Masson, Sol! in BH. *Vicia tetrasperma* "Moench," Bab. 82.—Mad. Fr. Masson 1777; not lately noticed.—I have never observed in Mad., but may have easily overlooked amidst a profusion of *E. gracile* (Loisel.), this common English hedge and cornfield weed. It is inserted on the authority of the spec. in BH. above referred to, which after careful examination is pronounced by my very exact and obliging friend Mr. Carruthers to be merely a trifling var. of *E. tetraspermum* L. as originally determined by Solander. I am also indebted to Mr. Carruthers for the following description of this typical ex.:—"Quite smooth. Tendrils simple unbranched. Lfts. all oblong smooth obtuse 5 lines long, 2 broad, in 2–3 possibly more pairs. Stip. simple undivided elongated-tri-

angular. Ped. 1-fld. awnless 1–1¼ in. long in fr., as long as or a little longer than the l. including the tendril. Fl. none remaining in the spec. Cal. and sep. smooth. Sep. with membranous margins, the 2 upper triangular shorter than the tube, the 3 others elongate-triangular not or scarcely longer than the tube. Pods 2–3-seeded smooth, 3½–4½ lines long by 1¼ line broad."

E. tetraspermum L. may be known from the common Mad. *E. gracile* (Loisel.) by its mostly forked tendrils, more numerous (in mostly 4–6 pairs) shorter and broader blunt mucronate lfts., shorter awnless 1–2-fld. ped., much smaller fl., distinctly unequal sep., 3–5- mostly 4-seeded pods, and seeds with a linear-oblong *hilum* twice as long proportionately to the circumference as in *E. gracile.*

9. E. CAPREOLATUM Lowe.

Subpuberulous branched slender climbing rampant; lfts. oblong or linear-oblong obtuse mucronate, in mostly 5 or 6 irregular remote pairs, the tendrils much branched and twining; stip. semi-sagittate or simple, small narrow-oblong or linear, acuminate withering: ped. many-flowered as long as or longer than the l.; cal.-teeth much shorter than cor., shorter than their tube, the 2 upper triangular-ovate broad and short converging; pods oblong compressed quite smooth faintly reticulate 3–5-seeded; seeds subquadrangular, oblong slightly compressed, even; *hilum* linear very long.—*Vicia capreolata* Novit. 23 or 545.—Herb. ann. Mad. reg. 3, rr. ND. rrr. Wooded banks and cliffs in ravines, Mad., as at the head of Rib. de S^{ta} Luzia, in the Serra d'Agua under Pico Grande; Rib. da Metade, de S. Jorge, do Seixal, &c.; ND. at the top near the ruined house, a single pl. May–August.—Whole pl. slightly pubescent more or less, only in ND. examples nearly smooth, of a full not at all hoary gr. St. very long spreading extensively over bushes or hanging 3 or 4 yards down rocks, slender sparingly branched ribbed or angular. Lfts. 2–6 pairs remote alternate or very irregularly paired, mostly 4–8 lines long and 1–2 lines broad, sprinkled, especially beneath, with short adpressed hairs. Stip. hairy, either simply acuminate or 2-toothed at the tip, otherwise quite entire except the toothlet at the base when they are semisagittate; soon turning red, then brown and dry. Stipels and bractlets none, or minute and deciduous. Rac. stalked secund, about 10–15-fld. Fl. 4–5 lines long, pale lilac or cream-colour, white and hoary with pubescence in the bud. Ped. in fl. about the length of the l., in fr. twice as long, subpubescent. Pedic. short thickly pubescent or hairy. Cal. submembranaceous thin pale or yellowish-gr. pubescent campanulate slightly compressed, ⅔-toothed; 2 upper teeth broad and short acute or even cuspidate approxi-

mate, their points singularly curving inwards towards each other, with strong fleshy midribs; 3 lower more produced or acuminate, with less prominent midribs and withered or discoloured tips; the teeth all hairy like the rest. Cor. cream-coloured more or less lilac, the standard streaked with dark-lilac or indigo-blue lines, keel nerved and tipped with a patch of the same, its edge pale y. or cream-colour. Stam. 1/9 not longer than the style, the sheath smooth. Style smooth below, clothed upwards chiefly beneath the capitate stigma with glandular spreading hairs, not bearded across with a distinct bunch or pencil as in genuine *Viciæ*. Ov. quite smooth. Pod $1\frac{1}{2}$ in. long and $\frac{1}{4}$–$\frac{1}{3}$ in. wide (in the ND. pl. narrower, viz. $1\frac{1}{4}$–$1\frac{1}{2}$ in. long and only 2 lines or $\frac{1}{6}$ in. wide), glaucous pale reddish brown or fawn-col. when ripe; straight or somewhat scimitar-shaped, the point curving upwards. Seeds rather large and shaped somewhat like horse-beans, 5 millim. long and 3 broad, mottled with black on a dark red-brown ground. *Hilum* linear extending the whole length of one side of the seed; *funiculus* very large and conspicuous. Nearly allied to the British *V. sylvatica* L.

23. VICIA L.

§ 1. *Cracca*; fl. in distinctly stalked secund spikes or racemes.

1. V. ALBICANS Lowe.

Ann. villose hoary, st. 4-sided climbing; lfts. elliptic-oblong mucronate in 6–12 somewhat irregular pairs, the tendrils much branched and twining; stip. semisagittate deeply cut and toothed; ped. 2–5- (mostly 2-) fld. much shorter than the l.; cal. coloured villose-hairy, the 2 upper teeth minute and indistinct, 3 lower linear-subulate shorter or not longer than the tube; pods oblong rather broad and short compressed velvety or densely pubescent about 4-seeded; seeds globose smooth.—Prim. 33; Seub. Fl. Azor. 49. no. 386. *V. gracilis* Sol.! MSS. quoad legumina; BH. quoad ex. ad dextram schedæ "2 Madeira, 1777; Fr. Masson" inscriptum; Buch! 197. no. 390 in part (not Loisel.). *Vicia micrantha* Lowe! Prim. 33 and App. (ed. 2. p. v). *V. atropurpurea* γ. *biflora* WB. ii. 105. *V. biflora*, WB. t. 65 B. (not Desf.).—Herb. ann. Mad. reg. 1, r. Sunny rocky ground in the neighbourhood of Funchal; *e. g.* at the top of the W. bank of the Rib. de João Gomes; amongst cornfields and waste ground to the E., especially below the Capella das Néves on the Caniço road; in the vineyards on the road to S. Antonio a mile out of Funchal to the W., &c. Jan.–June. —Root small fibrous with small tubers. St. diffuse branched at the base, climbing by means of the much branched 3- or 4-cleft tendrils, 2 or 3 ft. long leafy upwards and rather stout.

Whole pl. of a whitish or hoary dull gr. and more or less villose with white hairs. Lfts. from 12–25, mostly 20, irregularly opposite or alternate, very uniform in shape and size, about 5 or 6 lines long and 2 or 3 broad, obtuse or subacute, all distinctly mucronate. Stip. rather broad at the base, deeply cut into sharp subulate teeth. Ped. short quadrangular $\frac{1}{2}$–1 in. long, the l. being from 1–3 in. long. Fl. rather large $\frac{1}{2}$ in. long, mostly 2–4, lax or remote, a little larger than the fl. of *V. Cracca* L., bright rose-purple downwards, dark dull blackish-purple upwards, with the standard streaked with darker lines. Cal. similarly coloured more or less, with the 3 setaceous lower sep. greenish, the middle one longest but scarcely longer, often shorter, than the tube; the whole thickly clothed with long soft white hairs. Style hairy all round below the globose capitate stigma, bearded beneath; pod an inch or a little more long, 3–4 lines broad, flattened compressed, but a little turgid and torulose when ripe, pale brown or fawn-colour; in all stages thickly clothed with short adpressed soft white hairs. Seeds 4–6, mostly 4, dark-coloured, being mottled or marbled with dark-brown and small black specks on a paler greenish ground.

The true *V. atropurpurea* Desf., which I have gathered several times and carefully observed in the Canaries, is an altogether larger more robust pl., with full-gr. scarcely at all hoary foliage, and large many-flowered racemes: nor do these differences appear attributable to mere luxuriance of growth.

Vicia gracilis Sol.! in BH., and consequently of Von Buch, is a mixture founded on a spec. in fl., but without fr., of *Ervum pubescens* DC. β. supra p. 196 (inadvertently called by Lemann and Bennett in litt., and so twice by myself in Primit. (ed. 2) App. p. v, *Ervum hirsutum* L.), and *Vicia albicans* Lowe. An ex. of each of these two sp. has been pasted by Solander on one sheet,—that of *E. pubescens* DC. β. (Solander's original type, though he described the pods from the other spec.) being on the left hand of the sheet and referred to at the back as "1. Madeira, 1768, JB. and DS.;" the other right-hand spec. (*Vicia albicans* Lowe) being marked "2. Madeira, 1777, Fr. Masson." This last was the type of my *Vicia micrantha* Prim. p. 33; and it is certainly merely a smoother-leaved state than usual of *V. albicans*. See Prim. (ed. 2) App. pp. iv, v.

§ 2. Fl. nearly sessile, axillary either solitary or in short few-flowered clusters.

†2. V. CORDATA Wulf.

Robust succulent leafy pubescent bright full gr.; st. stout

succulent climbing not much branched; lfts. in 4 or 5 pairs pubescent *broadly orbcordate or obcuneate*, the upper more oblong, retuse or truncate with a very prominent awn or mucro, the lower less, *none more than 2–3 times as long as broad*; stip. semisagittate many-toothed laciniate, the teeth acuminate-aristate, darkly branded beneath; *fl.* 1–2-*nate all nearly sessile inconspicuous narrow-oblong*; sep. hairy-pubescent linear-lanceolate acuminate unequal, *the 2 upper distinctly longer than the tube*; cor. not more than twice as long as tube and sepals, standard narrow-oblong; pod narrow linear 8–9 times as long as broad, *smooth* even or scarcely nodulose *subreticulate or veiny* flat or compressed 10–12-seeded; *seeds rather large* (3½–4 mill.) *orbicular compressed smooth* and even, *plain black, separated by a slight spongy cellular dissepiment*.—DC. ii. 362; Koch 217; Gren. et Godr. Fl. Fr. i. 459.—Herb. ann. Mad. reg. 1, $\frac{c}{2}$; PS. reg. 3, r; GD. reg. 2, r.—Varr.:

α. Fl. dull-purple inclining to violet.

β. Fl. brighter-purple approaching to crimson.

Cornfields and waste ground, never cult. as a crop, but singly here and there, and often intermixed with *V. conspicua*; *α*. Mad. along the Caniço road to the E. of Funchal; *β*. with brighter col. more conspicuous fl., Mad. in corn; Loo-fields and between the Quinta do Valle and Rib. de João Gomes; grassy mountain pastures amongst brambles at the Terra Queimada above Machico on the road to S. Ant. da Serra; PS. at the base of the steep grassy slope half a mile below the top of Pico do Facho; GD. in the central valley. May–June.—A somewhat coarse and robust or rankly growing pl. of a bright full green, all over hairy-pubescent, and with rather large dense cumbrous foliage, 18 in. high, but little branched, climbing by means of its branched twining tendrils. Branches stout and succulent. Stip. much cut or toothed, stamped with a blackish depression beneath. Lfts. rather large and broad, 4–9 or 10 lines long, 2–3 broad and, except the lowest, which are shorter and broader (roundish-obovate or obcordate), very uniform in size and shape, coarser or more substantial than in *V. conspicua*. Fl. all solitary in Mad. and nearly or quite sessile, narrow-oblong with a narrow standard: in *α*. inconspicuous with the keel dark dull red; in *β*. rather or at least more conspicuous, of a brighter colour verging towards crimson or (in GD.) dark crimson. Sep. unequal, the 2 uppermost a little shorter than the rest, but distinctly longer than the tube, which is split up in fr., linear-acuminate, pubescent. Pod 24–27 lines (50–55 mill.) long, 3 lines (6 mill.) broad, pale or rusty brown quite smooth flat or compressed feebly reticulate or veiny and not knobbed or bossed by the seeds, which are only large in comparison with those of *V. conspicua* and not speckled.

Habit of *V. sativa* L., but distinguished by its strongly retuse or obcordate subbilobed lfts., black and narrow pods which are only half as broad in proportion to their length, smooth instead of pubescent, and less distinctly reticulate or veiny, with the seeds not prominent and much smaller.

3. V. CONSPICUA Lowe.

Slender with dull dark foliage mostly smooth sometimes pubescent; st. thin slender wiry branched climbing rampant; lfts. in 4–6 pairs *obovate-oblong* or *oblong* retuse or truncate, prominently awned or mucronate, *not more than* 3–6 *times as long as broad*, the lower broader obcordate, the uppermost only narrow-oblong or linear sometimes lanceolate or elliptic; stip. semisagittate many-toothed laciniate, the teeth acuminate, darkly branded beneath; *fl.* 1 *or* 2–4-*nate mostly* 2-*nate*, the lower solitary, upper 3-4-nate, *shortly but distinctly stalked* except quite the uppermost, *conspicuous*; *cor. pea-like with the standard at least as broad as long*; cal. subpubescent, sep. linear-subulate nearly equal and *nearly or about the length of tube*; pods straight narrow subcylindric 8–10 times as long as broad black *puberulous* even or scarcely nodulose, *not reticulate or veiny*, 9–12-seeded; seeds *small subglobose* smooth even *brown speckled with black, without any intermediate dissepiment.*

a. læta; nearly or quite smooth, rarely pubescent; upper lfts. oblong, uppermost narrow-oblong mostly linear; fl. bright purple-crimson.—*V. conspicua* Novit. 22 or 544.—Herb. ann. Mad. reg. 1, 2, ccc. Vineyards about Funchal, waste ground, cornfields, open mountain pastures and grassy places in ravines and thickets everywhere, a common weed. Jan.–July.—St. at first in early spring dwarfish low and spreading, but soon ascending branched and ultimately climbing to the height of 2 or 3 ft. by the branched twining tendrils; slender thin and delicate, but wiry or somewhat hard and tough. Foliage thin dark somewhat lurid-smoky-gr. Lfts. of lowest l. in 2 or 3 pairs small short broadly obcordate or rounded-obovate, scarcely longer than broad; of the middle oblong-obovate retuse; of the uppermost linear-oblong truncate; all prominently awned or mucronate, mostly quite smooth at least above, sometimes pubescent; mostly 3 or 4–6 or 8 rarely 12 lines long, and 1–2 or 3 rarely 4 lines broad. Stip. strongly and sharply laciniate-toothed, darkly impressed beneath, the barb at their base recurved. Fl. large handsome of a deep bright crimson-purple, the standard large and broad, not small and narrow as in *V. cordata*, at first solitary early in the year, then in pairs, and finally in clusters of 3 or 4 together towards the ends of the branches as the season advances; all distinctly stalked except quite the uppermost on the pl. or the lowest of the 2–4-fld. upper rac. Cal. pale or dark

purplish; sep. sub-equal, about the length of tube or a little shorter, small linear-acuminate. Pods finely but distinctly puberulous, dark coffee-brown or black, shining, about an inch long, $\frac{1}{8}$ in. broad, subcylindric scarcely compressed erect or declining. Seeds 10–12 small nearly globose scarcely compressed, $1\frac{3}{4}$–2 mill. in diam., brown speckled or mottled and streaked with black.

β. *dumetorum*; pubescent, lfts. all broader and shorter, the lower more roundly obovate or retusely oval, fl. bright purple-crimson.—Herb. ann. Mad. reg. 2, r.—Shady places amongst bushes, Rib. das Cales, 3000ft., Apr. May.—Merely a luxuriant drawn-up local form of *a.* with more uniformly pubescent broader shorter thinner paler lfts., passing gradually into *a*, but distinguishable easily from any state of *V. cordata* with its much more robust coarse habit, stouter st., stiffer or more substantial lfts., small inconspicuous narrow solitary (in Mad.) fl., smooth pods, and larger flattened black seeds.

γ. *lactea*; like *a*, but smaller, with finer pubescent foliage, and fl. milk-w. or cream-col.—Herb. ann. Mad. reg. 2, rrr. Up the Caminho do Meio, Funchal, Sr. J. M. Moniz.—A very distinct and elegant little pl., with the remote linear-oblong upper lfts. and habit of small fine-leaved pubescent states of *a*; from which therefore, not having seen ripe fr., I am unable to distinguish it more than varietally, though the smaller size of the fl., besides their colour, and the somewhat more than usual degree of pubescence of the lfts., seem to indicate a wider difference. The lfts. of the lower l. are small obovate or obcordate, of the middle oblong, of the upper remote linear 4–6 lines long, one broad: none more than 3–6 times as long as broad.

Difficult as it is undoubtedly to define accurately the two foregoing sp., in consequence of the liability to occasional variation of most of their assigned characters, I cannot after many years' observation regard them as mere races or varr. derived from a single sp. They appear also respectively distinct from the allied European sp., *V. sativa* L., and *angustifolia* Sibth. (EBS. t. 2614), which however I have not enjoyed equal opportunities of studying in a growing state.

The more slender habit, dark dull gr. mostly smooth foliage, thinner more oblong or oval lfts., of which the uppermost are often linear, stalked conspicuous 2–4-nate pea-like fl., narrow black puberulous pods, and small globose speckled seeds are the normal features of *V. conspicua* compared with *V. sativa* L. and *V. cordata* Wulf.

Its distinctness from *V. angustifolia* Sibth. (EBS. t. 2614) Sm.

E. Fl. iii. 282 ("not Roth, Willd., Rivin." Sm.) is much more questionable, resting principally on the large pea-like conspicuous brilliant-coloured crimson fl. with a broad expanded or dilated standard, and the mostly smooth dark dull-gr. foliage. So much of confusion and uncertainty prevails however with regard to the various pl. described under the name *V. angustifolia*, that I should be unwilling to perpetuate or perhaps add to it by its adoption in any of its various senses for the Mad. pl., even were it possible to establish the absolute identity of this with any one of them. The following synonyms are those however which certainly come nearest to *V. conspicua* var. *a læta*:

V. angustifolia "Sibth." Sm. E. Fl. iii. 282; Hook. in EBS. t. 2614; Hook. Br. Fl. (ed. 5) 1. 87 (excl. syn. *V. Bobartii* Forst. and *V. sativa* β. Sm. Fl. Br. 770). *V. angustifolia* β. *Bobartii* Koch 217 (not *V. Bobartii* Forster in EBS. t. 2708); Gren. et Godr. Fl. Fr. 1. 459. "*V. sativa* γ. Sm. Fl. Brit. 770." *V. sativa* δ. Ser. in DC. ii. 361.

Mr. Forster in EBS. t. 2708 appears to me to have exactly reversed the right syn. of t. 2614 and t. 2708. The former at least, by its *linear* upper lfts., seems, rather than t. 2708 with *lanceolate* upper lfts., to be the true *V. angustifolia* "Sibth." Sm. E. Fl. iii. 282, to which Hooker had previously indeed, at t. 2614, referred it. Very possibly however t. 2708 is nothing more than a dwarf early 1-fld. state of t. 2614.

4. V. PECTINATA Lowe.

Slender with dark dull foliage, sparingly and minutely but inconspicuously puberulous, appearing almost smooth; st. thin slender wiry branched climbing rampant; lfts. in 4–6 (mostly 5 or 6) pairs awned or mucronate, *all* except those of quite the lowest l. *pectinate parallel linear very long and narrow* 10–20 *times as long as broad mostly acuminate-cuspidate or acute*, the lower mucronate retuse, the lowest only oblong-obcuneate or obcordate and minute; stip. small half-sagittate laciniate-toothed, the teeth acuminate-subulate, pale-branded beneath; fl. *solitary or binate* all distinctly *stalked* conspicuous; cor. pea-like with the standard broad; cal. subpubescent, sep. linear-subulate nearly equal about the length of the tube; pods straight narrow *subcompressed* 8 or 9 times as long as broad black minutely puberulous *slightly knobbed by the seeds*, not reticulate or veiny, 10–12-seeded; seeds rather small nearly globose smooth even, tawny-y. thickly speckled with black, without any intermediate dissepiment—Herb. ann. Mad. reg. 1, rr. Amongst *Cacti* on the verge of the sea-cliff about a mile and half out of Funchal to the eastward, outside the Quinta on the right hand

ascending to the Chapel of N. S. das Néves, Dr. C. Lemann, April 1837; Calhêta in the Rib. de S. Bartholoméo April 1860, Lowe; Ladeira da Cruzinha, Fayal, Sr. J. M. Moniz, Sept. 1860.—Habit and foliage more like that of a *Lathyrus* or *Ervum* (particularly *E. gracile*, Loisel.) than a *Vicia*; whole pl. apparently smooth to the naked eye, but minutely puberulous when closely examined. St. 1–3 ft. long very slender and wiry loosely branched and rampant. Lfts. remarkably long and narrow, 9–18 or 20 lines long, ½–1 line broad, regularly pectinate, broadest from the middle downwards, mostly finely acuminate and cuspidate, sometimes abrupt or retuse and mucronate, a few only of the lowest broader and shorter oblong-obcuneate or obovate-obcordate. Fl. as in *V. conspicua*, but somewhat smaller, and I have never seen them more than binate, the lower solitary. Pods 15–20 lines long, 2–2½ broad, dark coffee-brown or black, somewhat knobbed. Seeds 2¼–2¾ mill. in diam. in my Calhêta ex.

Very distinct in form of lfts. and habit from its near ally *V. conspicua*, as expressed indeed by its first discoverer in the following words: "The very narrow-leaved *Vicia* which I gathered on the sea-cliffs east of Funchal, differs from any var. of the common *V. sativa* L. in having the broadest part of its lfts. towards the base. This is never the case in the other, however narrow the lfts. of some of its varr." (Lemann in litt., Lond., May 24, 1844.) Afterwards however Dr. Lemann was led by Mr. Bentham's high authority to regard it decidedly as a mere var.,—an opinion to which I am not prepared at present to assent.

5. V. LUTEA L.

Robust succulent leafy somewhat hairy; st. at first prostrate slender wiry, then ascending stout succulent scarcely climbing; lfts. in 5–8 pairs oblong mucronate or elliptic-lanceolate; stip. small, darkly branded beneath, simple ovate entire, the lower hastate or 1-toothed at the base; fl. nearly sessile solitary large conspicuous; cal. smooth, the 2 upper teeth shorter, 3 lower longer than the tube; all finely acuminate ascending; standard notched, smooth outside; pod short oblong broad and flatly compressed, mostly bulbous-hairy, spreading or deflexed, 4–6-seeded; seeds orbicular compressed smooth even.—EB. t. 481; Desf. ii. 165; Brot. ii. 151; Buch! 197. no. 391; Sm. E. Fl. iii. 284; DC. ii. 363; WB. ii. 108; Koch 216; Bab. 84.—Herb. per. Mad. reg. 2, ☿. Grassy banks in ravines. Apr.–July.—Subvarr.:

a. purpurascens; fl. pale sulphur, streaked and tinged more or less with v.-purple.—Cayados Ravine beyond Camacha abundant; W. Bank of the Rib. de João Gomes near Funchal, Dr. C. Lemann; with still more decidedly purple-tinged fl., Rib. de S. João, Funchal, Sr. J. M. Moniz.—Somewhat smooth, dark

shining gr. St. 1–2 ft. long procumbent and quadrangular below, succulent upwards and partly climbing by the branched tendrils, nearly smooth, sparingly branched except quite at the base. Lfts. in about 6 pairs, slightly hairy, those of the lower l. shorter broader and more abrupt than those of the upper. Stip. with the black impressed spot beneath large and spreading over the whole surface; in the lower stip. it is paler or frequently not present; they are also narrower than the upper with a single distinct spreading tooth at the base. Cal. pale green smooth; the 2 upper teeth equal, 3 lower unequal; the points of all curving upwards. Keel and wings of cor. pale sulphur; standard streaked with dark grey or dull v.-purple lines, more or less purplish at the base when fresh, but turning plain y. like the rest in drying. Pods about an inch long and 4 or 5 lines broad, usually more or less clothed with close-pressed hairs, but sometimes nearly or quite smooth: hairs issuing from a bulb or pustule.

β. *pallidiflora* DC. l. c.; more hairy, fl. nearly white.—*V. lutea* β. *hirta* WB. l. c.; Koch l. c.

Occasionally in vineyards, rrr; in my own on the Levada de S^ta^ Luzia near Funchal a single pl. once only, July 19th, 1844.—Whole pl. more robust and hairy, sprinkled with scattered distinct whitish hairs, dark gr., with thicker longer st. 2–3 ft. long. Lfts. in 6–9 pairs. Upper stip. simple with a large black spot beneath, lower semi-sagittate with a small pale one. Fl. very pale sulphur, nearly white or cream-colour. Upper teeth of cal. connivent shorter, the 3 lower especially the lowest or middle one longer than the cal.-tube. Standard smooth outside, plain-col. i. e. without dark lines or streaks. Style strongly bearded beneath below the stigma. Pods broad flat very hairy, appearing pustulose, each hair growing from a very large distinct bulb or pustule.

I am much inclined to concur with my able and accurate friend Mr. Newbould in believing that *V. lævigata* Sm. EB. t. 483 was merely a smooth-podded state or var. of *V. lutea* L.

†††6. V. NARBONENSIS L.

St. branched ascending or erect not climbing by the tendrils; lfts. in 2–6 pairs large oval-oblong or ovate serrate or entire thick or juicy; smooth and shining; stip. broad acute semi-sagittate and sharply toothed, the lower simple and entire; fl. rather large; rac. 1–4- or 5-fld. very short; cal. smooth campanulate, the teeth unequal ovate or lanceolate acute shorter than the tube 3-nerved; pod oblong broad and flat smooth densely fringed or muriculato-pilose at the edges; seeds subglobose compressed. —Desf. ii. 166; DC. ii. 364.

a. lfts. sharply serrate.—DC. l. c. 365. *V. Narbonensis* Brot. ii. 151; *β. serratifolia* Koch 215. "*V. serratifolia* Jacq. Fl. Austr. app. t. 8; Sturm Fl. Germ. 1 fasc. 32" (DC).—Herb. ann. Mad. reg. 1, rrr. Occasionally in vineyards about Funchal; in my own on the Levada de S^ta^ Luzia. June, July. Slightly hairy but otherwise more like a bean (*Faba vulgaris* Moench.) than a *Vicia*, in size and glaucous hue of lfts. and in size and aspect of the fl.; also approaching it in the upright habit. Branches and petioles more or less hairy at least on one side, quadrangular, somewhat stout, at least not slender; and though the l. have each a branched tendril, not climbing. Whole pl. more or less sprinkled with short distinct hairs, 6–12 in. high. L. with their few large smooth or slightly hairy glaucous lfts., which are about 1 in. long and $\frac{1}{2}$–$\frac{3}{4}$ in. broad, resembling those of the common garden-bean, but with a terminal branched tendril. Fl. axillary clustered dark blackish-purple (atro-purpureous) large, mostly 2–4 in a short bunch or rac. Pods (immature in my ex.) much compressed and thin or flattened, their edges serrulate with teeth terminating in a tawny-y. hair or bristle, "$1\frac{1}{2}$ in. long, 4 lines broad" (Brot.).

†††24. FABA Tourn.

†††1. F. VULGARIS Moench. *Fava.* Bean.

The only sp.—DC. ii. 354. *Vicia Faba* Linn., Koch 214. *Orobus Faba* Brot. ii. 147.—Herb. ann. Mad., PS. reg. 1, 2, cc. In vineyards, fields and gardens, cult. everywhere. Febr., March. —St. simple unbranched stout thick stiffly erect quadrangular bright gr., smooth like the whole pl. except the pods, 1–4 ft. high. Lfts. shining glaucous large and somewhat thick or succulent, in 1 or 2–5 pairs mostly irregularly alternate, oval or oblong entire mucronulate. Tendrils small or wanting. Stip. semi-sagittate sparingly and irregularly toothed large oval. Rac. 2–4- or 5-fld. shorter than the l. Cal. smooth pale gr. tubular, the teeth white-edged membranous with the midrib gr., the 2 upper short triangular-ovate connivent; 2 lateral twice as long, but not longer than the tube, lanceolate acuminate also connivent; lowest like the lateral but straight. Fl. rather large white or greyish with a large deep-black patch on each wing, in small nearly sessile axillary clusters, fragrant. Style pubescent, very distinctly bearded beneath below the stigma. Stam. completely monadelphous. Pods thick coriaceous velvety slightly viscid 2–5 in. long turgid more or less compressed 3–6-seeded, when quite ripe black. Seeds large oblong more or less compressed, separated by a thin spongy dissepiment, light yellowish- or dark coffee-brown; the linear scar or *hilum* at one end.—Formerly more largely cultivated than at present since the destruction of the vines, to which the st., dug into the ground after the beans were gathered, served for manure.

Pisum sativum L., the common Garden Pea, with w. fl. and unspotted seeds, is cultivated everywhere, and is in season for the table from Nov. (in Funchal) to May. *P. arvense* L., the Field Pea, known by its col. fl. (purple-violet standard) and angular compressed brown-spotted seeds, rarely and only accidentally occurs.

25. Lathyrus L.

§ 1. *Eulathyrus* Ser. in DC.; standard simple (without tubercles) at the base.—Annual; ped. 1–3-flowered. Lfts. none or in a single pair.

1. L. Aphaca L.

Smooth glaucescent suberect scarcely or little branched decumbent or climbing by means of the tendrils; *petioles leafless ending in a tendril;* stip. *large leaf-like ovate-sagittate or cordate*; ped. 1-*flowered*; sep. equal lanceolate twice the length of tube or rather more.—Desf. ii. 157; EB. t. 1167; Buch! 197. no. 386; DC. ii. 372; Sm. E. Fl. iii. 274; WB. ii. 109; Seub. Fl. Azor. 49. no. 387; Koch 221; Bab. 84. *Pisum Aphaca* Brot. ii. 145. —Herb. ann. Mad. reg. 1, 2, r.—Borders of cornfields and waste ground to the E. of Funchal along the Caniço road. Chestnut woods at the Mount, &c. March, Apr.—Remarkable for the entire want of lfts., which are replaced by the large broad leaf-like stip. Foliage bright light gr. often glaucous. St. upright but weak and climbing, 9–12 or 15 in. high. Whole pl. smooth and shining. Ped. about 2 in. long, rarely 2-flowered. Fl. y., for the genus rather small i. e. about 5 lines long; standard and wings full bright y., the former pencilled at the base inside with dark b. lines or streaks. Keel pale lemon-coloured or whitish. Bractlet on ped. always solitary; when, as occasionally, there are 2 fl. on the ped., the upper fl. only having one at the base of its pedicel. Pods 6–8-seeded oblong compressed subfalcate torulose reticulate, an inch long, 3 lines broad. Seeds suborbicular compressed smooth shining plain black, 1½ line in diam.; *hilum* small oval.

2. L. sphæricus Retz.

Smooth not glaucous suberect branched from the base diffuse not climbing with simple awnlike tendrils; the branches 4-angular; lfts. in one pair linear-lanceolate or linear grass-like elongate finely attenuated at both ends; stip. linear semi-sagittate as long as or longer than the petiole; ped. 1-fld. short, mostly shorter than the leafstalk, produced into a long slender awn longer than itself; fl. rather small; cal.-teeth nearly equal narrow lanceolate acuminate longer than the tube; pod narrow elongate slightly compressed and torulose strongly nerved longitudinally smooth 9 or 10-seeded, slightly margined at the back; seeds globose slightly compressed smooth and even.—"Retz Obs. iii. 39"; DC. Ic.

Pl. Gall. Rar. 1. 10. t. 32; DC. ii. 372 (excl. β); Koch 221. "*L. coccineus* All. Fl. Ped. no. 1222. *L. axillaris* Lam. Dict. ii. 706" (DC.). *L. angulatus* WB. ii. 111 (not Linn.).—Herb. ann. Mad. reg. 2, 3, r. Curral dos Romeiros a little way above the bridge at the bottom, in steep stony places; Serra d'Agoa Webb, 1828; by the road approaching the Curral das Freiras on the E. side, Dr. Lippold, 1837. May–July.—A small grass-like pl. resembling *L. Nissolia* L. Root small fibrous with a few little tubercles. St. erect amongst loose stones and grass, considerably branched towards the base but not bushy, the branches diffuse quadrangular throughout, not more than a foot long slender hard and wiry. Whole pl. quite smooth bright gr. Lfts. grass-like remarkably long and narrow, those of the upper l. 2–2½ in. long, ⅛–¼ in. wide, finely acuminate. Upper l. with a long simple awn-like mostly straight not curling or prehensile tendril; the petiole of the lower ending in a short awn-like point. None of the petioles, not even the lowest, aphylleus. Each half of stip. very narrow and finely acuminate, the upper half often considerably longer than the leafstalk which is 3–6 lines long. Ped. solitary axillary, produced into a long fine slender awn bearing at or below rarely above the middle of the whole length of the ped. and awn together a single, stalked fl. jointed to the ped. in fr.; the part below the joint or true ped. 1–12 lines long, but mostly considerably shorter than the awn or leafstalk. Fl. rather small, about 4 lines long or the size of those of *L. Nissolia* L., dull vermilion. Pods 1½–2 in. long 3 lines wide pale brown or fawn-col. smooth, with numerous strong longitudinal nerves, and the dorsal or seed-bearing suture narrowly margined, 8–12-seeded. Seeds orbicular rather than spherical compressed 2 lines in diam. 1 line thick dusky olive-brown obscurely spotted or speckled with black, quite smooth and even; *hilum* oval or ovate.

†††3. L. SATIVUS L. *Chicharo.*

Nearly smooth somewhat glaucous branched bushy suberect climbing by the branched tendrils; branches diffuse winged compressed; petioles narrowly winged linear; lfts. in one pair linear-lanceolate elongate acuminate; stip. oblong or ovate-lanceolate semi-sagittate shorter than the slightly winged leafstalk; ped. 1-fld. *longer than the leafstalk* awnless; fl. large; cal.-teeth herbaceous lanceolate equal almost 3 times as long as the tube; pod short *ovate or elliptic* compressed irregularly reticulated smooth, *curved 2-winged* and channeled at the upper edge or suture, mostly 3-seeded; seeds 2–4 compressed angular smooth even.—BM. t. 115; Desf. ii. 158; Brot. ii. 138; Fl. Gr. t. 695; Buch 197. no. 387; DC. ii. 373; WB. ii. 112; Koch 222; Seub. Fl. Azor. 49. no. 388. *L. sativus* γ. *coloratus* Ser. in DC. l. c.—Herb. ann. Mad. reg. 1, 2, cc. A common crop cult.

in fields below 2000 ft., either alone or amongst corn, Loo fields towards the Praia, to the E. of Funchal, &c. Febr.–May.— Bushy upright about 1 ft. high, the lower side-branches elongate straggling or spreading horizontally diffuse; dull gr. slightly glaucous smooth except a few scattered hairs occasionally on the edges of the stip., &c. Lfts. 1½ in. long, ¼ or ⅓ in. wide, finely acuminate. Stip. large leafy strongly semi-sagittate with mostly a single intermediate distinct tooth. Ped. an inch long, considerably shorter than the l. with a single terminal fl. on a short pedic. jointed to its apex, having 2 very minute bractlets at the junction. Pedicel ¼ in. long. Fl. scentless, always in Mad. dull greyish-b., about the size of those of *Pisum sativum* L. or *Lathyrus odoratus* L. (Sweet Pea). Standard broad 6–9 lines wide, dull greyish-b. paler towards the edges, with darker veins and a bright red-purple spot at the base behind, hidden by the wings, which close over the keel and are of a deep full indigo-b. with a red purple spot at the base of the hinder edge of each over against the similar spot on the standard. Keel nearly white, distorted, quite concealed by the adpressed wings. Pod pale brown or fawn-col. an inch long, ½ in. (including wings) wide, with both margins curved and 2 distinct sharp thin membranous wings on the back, each nearly ⅛ in. broad, and a deep intermediate channel. Seeds large angular compressed pale yellowish or greenish 2–3 lines in diam. quite smooth and even; *hilum* oblong-oval.

I have never seen the fl. either in Madeira or in the Canaries varying from the above description further than in the greater or less extent or intensity of blue in the wings and standard, leaving less or more of the edges pale or whitish, and in the latter case assuming, especially in dried specimens, somewhat of the character of a central suffused b. patch or spot. M. Seringe's var. γ. *coloratus* in DC. is therefore scarcely worth distinguishing.

Such fatal effects were produced in the latter end of the 17th and beginning of the 18th centuries in some parts of Europe by the use of the seeds of this pl., that the authorities were obliged to interfere and forbid its cultivation. In Martyn's ed. of Miller's Dictionary, the flour prepared from the seeds is said to make a pleasant light bread, which, if half the quantity of wheat flour has been mixed with it, is also perfectly harmless: but when used unmixed, those who have lived on it for some continuance are seized, it is said, with violent spasmodic attacks of rigidity of the muscles, followed by the total and incurable loss of the use of their limbs; and it is added that these effects

even extend to poultry and cattle (pigeons, swine and horses) fed upon it. These noxious qualities however, if not indeed due perhaps to the presence locally or temporarily of some such disease as the Ergot of Rye in the pl. itself, seem to have depended in some measure on the nature of the soil, having been more powerful in pl. produced in a rich strong and moist than in a poor dry one. At all events, in the light dry soil in which this pl. grows mostly in Mad., and used chiefly though to some extent by the peasantry as an ingredient in "Sopas" or mixed with other food, these deleterious properties have never been remarked.

†††4. L. CICERA L. *Chicharo branco*, PS.

Nearly smooth somewhat glaucous branched bushy suberect climbing by the branched tendrils; branches diffuse winged compressed; petioles narrowly winged linear; lfts. in one pair linear-oblong elongate acuminate; stip. large leafy broadly lanceolate semi-sagittate as long as the leafstalk; ped. 1-fld. longer than the leafstalk awnless; fl. not large; cal.-teeth herbaceous lanceolate equal, almost 3 times as long as the tube; *pod oblong straight-edged rather narrow* compressed, irregularly reticulated, smooth, straight and merely channeled (*not winged*) at the back, mostly 4-*seeded*; seeds 3–5 compressed angular smooth and even. —Desf. ii. 158; Brot. ii. 137; DC. ii. 373; Koch 222. "*L. sativus* β. Lam. Dict. ii. 705."—Herb. ann. Mad., PS., reg. 2, cult. r. Subvarr.:

1. *purpurea*; standard deep blood-crimson or purple. *L. Cicera* L., Desf.?, Brot.?, DC., Koch ll. cit.; Fl. Gr. t. 694.—Mad. cult. as a crop descending into the Rib. de S^ta^ Luzia from the Mount; S. Vicente in fields towards the lower Forno de Cal at the bottom of the steep zigzag ascent to the Lombo de Vaca. May–July.—About a foot high. Habit, &c. of *L. sativus* L. but fl. considerably smaller with the standard of a deep rich (blood-red) purple. Pods an inch long 3½–4 lines broad pale brown or fawn-col., torulose, oblong with straight parallel margins, merely channeled slightly and not winged along the perfectly straight dorsal suture. Seeds 2 lines in diam. 3–4 compressed angular dark brown; *hilum* oval.

2. *cærulea*; standard blue (purple when dry!) wings and keel paler or white.—PS. cult. as a crop amongst cornfields on the hills; Serra de Dentro amongst corn on the way to the back of the Pico Branco. May, June.—Fl. rather small compared with those of *L. sativus* L. Pod 1 in. long 3–4 lines broad, pale straw-colour; the suture not winged but merely channeled, with raised edges only; mostly 4-seeded. Seeds 3–5 subquadrangular slightly compressed quite smooth and even, pale straw-

colour faintly and minutely streaked or mottled with dull ochre-y.

In habit, foliage, and stature *L. Cicera* L. agrees with *L. sativus* L., differing principally in the narrower oblong unwinged 4-seeded pods, larger stip. and smaller differently coloured fl.

5. L. ANNUUS L.

Smooth branched climbing by the branched tendrils, branches rampant winged; lfts. in one pair linear-lanceolate long and narrow elongate acuminate nerved; stip. semi-sagittate very narrow linear much shorter than the leafstalk; ped. longer than leafstalk, shorter than l., mostly 1- rarely 2-fld.; fl. middle-sized; cal-teeth ovate-lanceolate not quite equal scarcely longer than the tube; pod narrow-oblong slightly compressed closely and distinctly reticulated smooth very narrowly channeled at the back 6–8-seeded; seeds globose smooth thickly granulate or warted.—Brot. ii. 141; Buch! 197. no. 388; DC. ii. 373; Spr. iii. 262; WB. ii. 112; Koch 222.—Herb. ann. Mad. reg. 2 and upper edge of 1, r. In bramble hedges in the neighbourhood of Funchal from 500 to 1500 ft., as by the roadside about a mile below the Palheiro, in a cross-road joining the Caniço and Camacha roads about a mile out of Funchal, a little above the Palmeira, &c. March–May.—Habit somewhat of *L. odoratus* L., rather dull gr. not glaucous. St. climbing like the garden Sweet pea (*L. odoratus* L.) to the height of 3 or 4 ft., broadly winged upwards. Lfts. grass-like 4 or 5 in. long, about $\frac{1}{3}$ in. broad, attenuated at both ends. Stip. small very fine and narrow. Leafstalks an inch long broadly winged. Fl. y. scentless not inconspicuous but mostly rather smaller than those of *L. Clymenum* L. Ped. 1- rarely 2-fld., at first as long as, but presently much shorter than the l., minutely or obsoletely bracteleted at the base of the pedicel, rarely awned by abortion of the 2nd fl. Fl. pea-like 5-6 lines long. Standard rather dull orange-y., streaked inside with red and veined, with a prominent plait or fold not tubercle on each side at the base. Wings bright y. rounded. Keel greenish-y. very blunt and thick. Pods 2–$2\frac{1}{2}$ in. long 4 lines broad somewhat compressed straight mostly 8-seeded; when fully ripe of a pale yellowish brown and somewhat rough from the more prominent reticulating veins. Seeds perfectly globose nearly 3 lines in diam. elegantly warted or granulate all over, of a dark dull brown speckled irregularly with black, and having a slight glaucous bloom; *hilum* oval or elliptic.

††6. L. TINGITANUS L.

Smooth dull gr. or glaucescent branched climbing by the branched tendrils; branches stout rampant flexuose winged; lfts. in one pair oval- or elliptic-oblong obtuse mucronulate, the up-

per lanceolate; stip. ovate-oblong or lanceolate semi-sagittate shorter than the leafstalk; ped. somewhat longer than l., 1–3-mostly 2–3-fld.; fl. large remote; sep. unequal, 2 upper shortest ovate, 3 lower longer and narrower, all shorter than the tube; pod linear-elongate compressed subtorulose faintly reticulated smooth 6–7-seeded, the sutures narrowly bimarginate; seeds oval compressed smooth and even.—Jacq. Vindob. 18. t. 46; BM. t. 100; Desf. ii. 160; DC. ii. 374; WB. ii. 113; Seub. Fl. Azor. 49. no. 389.—Herb. ann. Mad. reg. 1 (upper part) rrr. Waste rocky ground above the Quinta de S. Miguel along the Levada de S^{ta} Luzia, Funchal, "quite naturalized" (Sr. J. M. Moniz 1860). Apr., May.—A stouter more robust pl., larger and coarser in all its parts than any other of the Mad. *Lathyri*, and with broader shorter dark dull gr. or somewhat glaucous lfts. St. stout stiff quadrangular winged. Petioles about an inch long angular stout and stiff, produced into a long stiff naked stalk 1–3 in. long, and then mostly 3-branched into long slender tendrils. Stip. large and leafy, broader than usual. Lfts. 1–2 in. long, 3–6 lines broad, many-nerved. Ped. 2 or 3 in. long erect stout. Fl. very large scentless dark atropurpureous red-purple, about an in. broad or long, placed when more than one remotely on the ped. Pods 3–4 in. long 4–5 lines broad, very smooth and shining pale yellowish-brown or fawn-colour. Seeds $3\frac{1}{2} \times 2\frac{1}{2}$ lines in diam. dark rich reddish-brown mottled and streaked with black, perfectly smooth and even; *hilum* linear=about $\frac{1}{3}$ circumference of seed.

Common in most of the Canary Islands, but assuredly of very recent introduction into Mad.

§ 2. *Clymenum* DC.; standard with a pair of compressed tubercles inside at the base, one on each side. Annual; ped. 1–few-flowered; lfts. several, mostly alternate, in the lower l. wanting.

7. L. Clymenum L.

Smooth *more or less glaucous tall branched* rampant, st. slender elongate climbing by the branched tendrils, winged 4-sided; lfts. in mostly 3–4 pairs often alternate narrow-oblong or linear-lanceolate slightly obtuse mucronate; stip. obscurely semi-hastate unequal lanceolate or ovate-lanceolate, 2–3-toothed at the base, the uppermost large leafy ovate; ped. *as long as or longer than the l.*, 1–3-*fld.*; fl. *rather large*; cal. deep-cleft above; sep. unequal, the 2 upper short triangular *remote diverging laterally*, 3 lower narrower and longer parallel, all much shorter than the tube; style rhomboidally spathulate; pod narrow-oblong with straight margins subcompressed very narrowly and faintly channeled at the back, smooth *and nearly or quite even*, mostly 6–8-

seeded; seeds subglobose a little compressed subangular or straight and truncate at the *hilum*, smooth and even; *hilum* linear=$\frac{1}{5}$ circumf. of seed.—Desf. ii. 160; Brot. ii. 140; Buch! 197. no. 389; DC. ii. 375. *L. tenuifolius* Desf., DC. ll. cc.—Herb. ann. Mad. reg. 1, 2, c.—Subvarr.:

1. *atropurpurea*; standard dark claret-purple, wings blue.—Mad. in bramble-hedges, beds of *Opuntia* and waste ground from 300 to 1500 ft., by the Caniço and Palheiro roadsides to the E. of Funchal, in the Rib. dos Cayados beyond Camacha, &c., c. March–May.

2. *roseopurpurea*; standard red-purple or rose, wings pale violet-blue; fl. and whole pl. sometimes smaller and more glaucous.—Mad. occasionally with subv. 1. a little to the E. of Funchal, above the Brazen Head, up the Caminho do Meio, &c., r. March–June.

3. *albiflora*; standard pale blush-rose or purple or nearly or quite w.; wings white.—Mad. between the Caniço road and Brazen Head; Levada do Bom Successo, Sr. Moniz; rrr. Apr., May.

Quite smooth and with the fl. scentless, but otherwise with much the habit or aspect of the common garden Sweet Pea (*Lathyrus odoratus* L.); the fl. presenting analogous phases of col. Whole pl. of a dull dark slightly glaucous gr. sometimes decidedly glaucous especially in subvar. 2. St. winged rather than 4-angular weak and slender 2 or 3 to 5 ft. high, branched throughout and climbing extensively. Leafstalks winged, the lower broadly so, dilated, leafless. Lower stip. none or very small; middle stip. lanceolate; uppermost broadly ovate, one much larger and broader than the other, scarcely or indistinctly semi-hastate but with one or more minute teeth at the base. Lfts. 1–2 in. long, 1–3½ mostly 1–2 lines wide, in 2–4 mostly 3–4 pairs often placed irregularly or alternately. Ped. 2–3 or 4 in. long, the lower 1-fld. shorter, upper rarely more than 2-fld. longer than the l. Fl. rather smaller than in *L. odoratus* L. but with the same variations in colour, viz. with the standard dark mulberry, rose-purple, pink, or white. Cal. unequally cleft, 2 upper sep. broadly half-ovate or triangular divergent, 3 lower narrower approximate and parallel. Style short straight broad upwards, pubescent above, smooth beneath, rhomboidal-spathulate and abruptly contracted at the apex into a short inflexed point. Pods 6–10-seeded about 2 in. long and $\frac{1}{3}$ in. broad, not much compressed, quite smooth and even i. e. not at all or very obscurely torulose and with both margins perfectly straight or even, very faintly and indistinctly or not at all reticulated, pale brown or fawn-colour; altogether much resembling those of *L. odoratus* L. Seeds 2 lines in diam. somewhat compressed and angular, perfectly smooth and even, dull blackish, being thickly

mottled or speckled with black on a dark-brown ground. In subv. 2, the pods have often a dark discoloured stripe up the middle of each valve.

A variable pl. altogether, and not alone in size and colour of fl. The lfts. vary so much even on the same pl. at different periods of growth, that it is impossible to employ the char. of their greater or less breadth for the formation of two varr., and I have therefore treated *L. tenuifolius* Desf. as a mere transient form. The foregoing subvarr. may however be distinguished ordinarily, though they also gradually blend together. In ex. of subv. 1 and 3 which have been 24 years in my herbarium, the seeds are not as above described from fresh ex. in Mad., but plain dull blackish brown globosely lenticular, with a slightly raised obtuse keel or belt dividing them into two hemispheres, and not smooth and even, but obsoletely and irregularly granulate.

8. L. ARTICULATUS L.

Smooth *not glaucous dwarfish not branched* except at the base, not rampant; st. *stout robust* broadly winged 4-sided climbing by the branched tendrils; lfts. in 2–3 pairs, mostly alternate oblong-lanceolate or elliptic acute *cuspidate*; stip. semi-sagittate unequal, the upper large leafy ovate-oblong or lanceolate; ped. *shorter than the l.* 1–2-fld.; fl. middle-sized crowded towards the ends of the branches; cal. *rather large and subinflated*, sep. short triangular unequal, 2 *upper approximate or converging*, 3 lower narrower and longer, all much shorter than the tube; style rhomboidally dilated upwards; pod narrow-oblong much compressed or flat, *strongly knobbed or laterally torulose* substrangulate with slightly sinuate margins, 4–6-seeded, marginate and 3-nerved but flat and not channeled at the back or upper suture, smooth faintly reticulate; seeds *subremote large prominent quadrangular* compressed, smooth dark dull velvety-brown with black specks; *hilum* linear = $\frac{1}{5}$ circumf. of seed.—BM. t. 253; Desf. ii. 159; Brot. ii. 139; DC. ii. 375; WB. ii. 110, 111?—Herb. ann. PS. reg. 2, $\frac{r}{2}$. Here and there naturalized and cult. with *L. Cicera* L. as a crop amongst corn occasionally on the hillsides; GD. $\frac{r}{2}$. May, June. In 1832 the crops of the present pl. in PS. were quite gr. and still in full fl., whilst those of *L. Cicera* L. were mostly ripe.—Habit as a crop more like that of *Vicia sativa* L. than of either *L. Cicera* L. or *L. Clymenum* L., growing interwoven or matted, with short dwarfish st. not above 12 or 18 in. high, and branched only from the base or crown of the root. Whole pl. bright full gr. St. and foliage altogether larger or stouter and coarser than in *L. Clymenum* L., the former more broadly winged. Petioles broadly winged, the lower leafless. Lfts. 3

or 4–5 or 6, rarely in pairs, 1–1½ in. long, 2–3 lines wide, strongly and distinctly cuspidate. Ped. mostly 2-fld. and somewhat crowded upwards. Fl. rather smaller than in *L. Clymenum* L. and more compact. Style pubescent above upwards and rhomboidal-pointed. Pod 2 in. long, ¼ in. broad, beaded or articulated as it were on the sides by the prominence laterally of the seeds, and with both the margins slightly waved or strangulate between the seeds, the dorsal or seed-bearing suture thick and tumid, not winged or channeled, reddish-brown or tile-colour. Seeds dull dark smoky brown mottled and streaked with black, appearing velvety but perfectly smooth and even, larger fewer more remote and flattened than in *L. Clymenum* L., 3 lines long × 2½ wide, oblong-quadrangular tumid compressed subcarinate. Subvarr.:

1. *atropurpurea*; standard dark claret-purple. P^to^ S^to^ cult. and here and there naturalized.

2. *rosea*; standard rose. PS. in a little thicket of White Poplars by the unfinished Church of N. S. da Graça; GD. up the central valley.—BM. t. 253; Desf., Brot., WB. ? ll. cc.

Nearly allied to *L. Clymenum* L., but certainly distinct. It is altogether more dwarfish and robust in habit, with much stouter shorter st., not slender elongate rampant branched or straggling, shorter broader stiffer distinctly cuspidate lfts., shorter ped., smaller more compact fl. with a less dilated or expanded standard and almost always in pairs, fewer- more remotely-seeded pods, which are strongly knobbed or beaded at the sides, and slightly waved at the edges by the prominent large flattened seeds, which are much larger than in *L. Clymenum* L.

There are no spec., Mr. Carruthers assures me, from either Webb or Bourgeau of *L. articulatus* L. in BH. In HH. Mr. Black tells me there is only a spec. marked "Canaries, Despreaux," which has been named by Planchon "*L. Clymenum* L.," and one sent by Bourgeau for *L. Clymenum* L., but which is certainly *L. tingitanus* L. Hence it is very doubtful whether *L. articulatus* WB. l. c. collected by Despreaux in Gr. Canary was really the true pl. Certainly I have never met with it in any of the Islands.

††9. L. Ochrus (L.)

Quite smooth glaucous sparingly branched procumbent or diffuse; branches zigzag stout slightly climbing by the tendrils of the upper l. 4-sided broadly winged; leafstalks broadly winged, the lower leafless, the upper with 2–4 ovate or oval mucronate

lfts. and a short branched tendril; lower stip. none, upper large leafy semi-sagittate ovate or lanceolate; ped. 1-fld. much shorter than the l.; sep. short triangular unequal; style spathulate-rhomboidal acute; pod large smooth reticulate oblong compressed 2-winged at the back, even, 6–8-seeded; seeds large globose quite smooth and even; *hilum* linear = $\frac{1}{5}$ circumf. of seed. —DC. ii. 375; WB. ii. 110; Koch 221. *Pisum Ochrus* L.; Brot. ii. 144; Fl. Gr. t. 689. "*Ochrus pallida* Pers."—Herb. ann. PS. reg. 4, rrr. Summit of Pico Branco amongst grass and herbage in a spot frequented by shepherd-boys, and evidently introduced. Apr., May.—Habit of the common Garden Pea (*Pisum*) with stout succulent tubular flexuose diffuse trailing st. 1–2 feet long, branched chiefly at the base, and climbing only ultimately by means of the tendrils of the upper l. St. and petioles very broadly winged. Lfts. $\frac{3}{4}$–$1\frac{1}{4}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ broad, in pairs or alternate, subobtuse feebly mucronate. Ped. 5–12 lines long, stout, firm, jointed at the top, not awned, always 1-fld. Pedic. 4 or 5 lines long. Fl. pale dull y. Pods about 2 in. long and very nearly $\frac{1}{2}$ in. broad brownish-fawn-colour smooth and shining, not in the least torulose. Seeds perfectly globose $2\frac{1}{2}$-3 lines in diam. dull reddish-brown or tile-colour not shining.

†††Tribe IX. *Phaseoleæ*.

†††26. PHASEOLUS L.

§ Pods compressed; annual, lfts. entire, ped. shorter than the l.

†††1. P. VULGARIS L. *Feijão.* **French Bean** or **Kidney Bean.**

Twining smoothish; lfts. rhombic-ovate acuminate; rac. axillary stalked shorter than the l., fl. in pairs 2-bractleted; pods pendulous compressed elongate mostly straight subtorulose beaked; seeds oblong-reniform compressed or more or less globose and turgid, very variable in shape, size and colour.—Koch 226. *P. vulgaris* et *P. nanus* L., Brot. ii. 129, 130. *P. vulgaris, Romanus* (*compressus* DC.), *oblongus, saponaceus, tumidus, hæmatocarpus, sphæricus, gonospermos* Savi, DC. ii. 392, 393. Varr.:

a. procera; *F. de vara*; st. elongated twining and climbing to a considerable height (10–15 ft.).—*P. vulgaris* Linn., Desf. ii. 155; Brot. ii. 129.—Herb. ann. Mad. reg. 2, cult. ccc. Cultiv. principally in the north, S. Vicente, Bôa Ventura, S. Jorge, S^{ta} Anna, Porto da Cruz, &c., in the chestnut woods. Aug.-Oct.—Running up long rods or poles (*varas*) 8–10 ft. high, usually of Heath (*Erica arborea* L.), and forming perfect thickets and bowers of verdure of a light pleasant gr. Fl. light purple, lilac, rose, pale pink, pale ochre, cream-colour, or white, but not at all corresponding regularly in their tints (as I have ascertained experimentally) with the variations in the seeds. These are almost endless: but since they are employed popularly for distinction

by the country-people, they will best serve the same purpose for the local botanist or horticulturalist, especially in the absence of any other more fixed or constant characters.

Subvar. I. *nephrosperma*; seeds oblong-reniform compressed rounded at each end.

A. *unicolor*; seeds self-coloured uniform.—*P. vulgaris* A, Savi, DC. l. c.

1. Bluish- or raven-black. *Feijão roxo*; *F. preto.*
2. Atropurpureous or dark rich purplish liver-brown. Fl. pale ochraceous. *F. de pobre.*
3. Violet or bluish passing into grey and brown. Fl. purple. *F. azul.*
4. Liver-brown, often faintly mottled with dark brown = *a.* II. A. 3.
5. Flesh-colour passing into brown. Fl. purple.
6. Dove-colour passing into fawn or pale brown, with a fulvous (orange-tawny) ring round the *hilum*. *F. Coelho.*
7. Fulvous or tawny-yellow with an atropurpureous ring round the *hilum*. *F. amarello.* Cf. *a.* II. A. 2.
8. Pure white. Fl. white.—*P. compressus* β. Savi, DC. l. c.

B. *fasciata*; seeds with dark interrupted longitudinal stripes or streaks.—*P. vulgaris* B. Savi, DC. l. c.

1. Violet or dark purplish-blue with obscure black streaks. Fl. pale purple or flesh-colour.
2. Purple passing into flesh-colour and gilvous or fulvous, with red streaks and specks. Fl. pale purple.
3. Gilvous flesh-colour, with liver-coloured streaks. Fl. pale purple or flesh-colour.
4. Flesh-colour passing into brown, with black streaks or stripes. Fl. purple.
5. Lilac-grey (i. e. cream- or dove-colour thickly and minutely sand-speckled with v.-purple), with black streaks.
6. Cream-colour, with black streaks. *F. rajado.*—a) without black specks; b) with black specks, *F. lêtra.*
7. Cream-colour, with v.-purple streaks and specks. *F. rajado*; *F. do Seixal.* Blends into I. C. 3. b.
8. Dove-colour, with olive streaks. *F. rajado.* Cf. *a.* II. B. 2.
9. Turgid; red with orange-tawny streaks.

C. *variegata*; seeds variously mottled or speckled, marbled or blotched (piebald).—*P. vulgaris* C. Savi, DC. l. c.

1. speckled dark v. or raven-black and flesh- or dove-colour. Fl. purple. *Corno de carneiro.* a) dark, b) light predominating.
2. Speckled dark atropurpureous and whitish or cream-colour. Fl. purple. *Corno de carneiro.*
3. Speckled bright-red purple and pale flesh-col. or fulvous cream-colour or y. Fl. pale purple or flesh-colour. *F. de gallo.* a) purple with fulvous or cream-colour specks; b) cream-coloured with purple specks (see I. B. 7); c) white with purple specks and pure white, piebald.
4. Light fulvous-y. speckled with white. *F. dourado.* Passes into II. C. 3. a.
5. Piebald, fulvous or dark tawny-y. and pure w.
6. Piebald, half and half atropurpureous and white. *F. brazileiro.*
7. Piebald, chiefly white with a large irregular atropurpureous blotch about the hilum. *Pinta silgo.*
8. Nearly all white, with a small distinct somewhat cruciate atropurpureous eye or mark about the *hilum.* Corresponds with II. C. 5 and III. C. 4.

Subvar. II. *gonosperma*; seeds rhomboidal subcompressed thickly and shortly oblong subangular obliquely truncate at the ends.

A. *unicolor*; seeds self-coloured uniform.—*P. gonospermos* Savi, DC. l. c.

1. atropurpureous or purple. *F. vermelho.*
2. Fulvous or tawny-yellow rarely passing into dull drab-brown. *F. amarello.* = *a.* I. A. 7.
3. Liver-brown often faintly mottled with darker brown = *a.* I. A. 4.

B. *fasciata*; seeds with dark interrupted longitudinal stripes or streaks.

1. Dove- or cream-colour with fulvous-y. streaks. *F. menino.*
2. Dove-colour with olive-brown streaks. Cf. *a.* I. B. 8.
3. Light fawn-, flesh-, or dove-colour with dark blackish streaks or blotches. Cf. *a.* I. B. 4.
4. Purple passing into flesh-colour and gilvous or fulvous with red streaks and specks. *F. parrêira* = *a.* I. B. 2.

C. *variegata*; seeds variously mottled or speckled, marbled or blotched (piebald).

1. Dark-rich-claret nearly black obscurely mottled or subfasciated with dark fulvous or chestnut.
2. Atropurpureous or dark blood-red, dove- or cream-colour, and fulvous. *F. de bala.*
3. Fulvous or tawny-brown speckled with white. *F. amarello.* a) light fulvous-y., *F. dourado*=*a.* I. C. 4; b) dark tawny-brown.
4. Piebald, half and half atropurpureous and white. *F. de Lisbôa*; *F. carrapato.*
5. White with an atropurpureous eye or mark about the hilum. *F. olho de peixe.*

Subvar. III. *sphærosperma*; seeds subglobose turgid-ovate or globosely oval.—*P. hæmatocarpus, sphæricus* Savi, DC. l. c.

A. *unicolor*; seeds self-coloured uniform.—*P. sphæricus* Savi, DC. l. c.

1. Atropurpureous. Fl. pale ochraceous.
2. Dark rich liver-brown or chestnut. *Baga d'azevinho.*
3. Orange-tawny, i. e. bright fulvous. Fl. pale purple or flesh-colour. Passing into III. B. 1.

B. *fasciata*; seeds with interrupted stripes or streaks.

1. Dove-colour or ochraceous with fulvous streaks. *F. menino*=II. B. 1.
2. Dove-colour, tawny-flesh or fulvous with red streaks and spots; passing into III. C. 2.

C. *variegata*; seeds mottled or speckled, marbled or blotched (piebald).—*P. hæmatocarpus* Savi, DC. l. c.

1. Speckled blood-red, flesh, dove- or cream-colour, and fulvous or tawny-yellow. *F. de bala*=II. C. 2.
2. Tawny flesh- or dove-colour spotted and speckled with red, the red often confluent into streaks or blotches; passing into III. B. 2.
3. Piebald, half and half atropurpureous and white. *F. de Lisbôa. a)* plain; *b)* speckled=II. C. 4.
4. Nearly all white with a small distinct somewhat cruciate atropurpureous eye or mark about the *hilum. F. olho de peixe* or *de bala*=II. C. 5.
5. Altogether pure white. Possibly belongs to var. β. *nana* III.

Subv. II. passes by such imperceptible gradations into I. and III., that it is only here retained conventionally to avoid confusion, and because of *P. gonospermos* Savi. The Portuguese, as may be seen from the recurrence of the same name under each of the above subvarr., depend alone on colour, neglecting shape, which indeed is often merely due to pressure caused by a greater number than usual of seeds in the same pod. On the other hand, the gradations of colour are perhaps equally fluctuating, numerous, and accidental.

In the valley of Porto da Cruz, the sorts most esteemed for productiveness are, 1. *F. rajado*, 2. *F. de Lisbôa*, and 3. *F. menino*.

The young green pods, used so much in England sliced and boiled as a vegetable under the name of French or Kidney Beans, are called by the Portuguese "Bajinhas," but are not employed by them for food. The ripe seeds, "Feijoens," called by the French "Haricots," constitute however a great proportion of the daily food of the poor or labouring population, and are a favourite ingredient in their "Sopas" with all classes. The quantity produced annually, especially in S. Vicente, is prodigious.

β. *nana*; *F. rasteiro* or *F. da vassoûra*; st. short dwarfish, low and scarcely twining (6–18 in. high).—*P. nanus* Linn.; Brot. ii. 130. *P. compressus* α. DC. *P. oblongus, saponaceus* Savi, DC. l. c.—Herb. ann. Mad. reg. 2, cult. $\frac{r}{2}$.—Comparatively with α. little cultiv. in Mad. except at S. Vicente.—Varies with seeds, I. oblong-reniform compressed (*P. compresus* α. DC.; *P. saponaceus* Savi, DC. l. c.); II. seeds oblong-tumid, rounded or cylindric (*P. oblongus* Savi, DC. l. c.); and III. seeds spherical or turgid-ovate (*P. tumidus* Savi, DC. l. c.),—each subvariety presenting much the same phases of colour as those of var. α. *procera*.

Of β. I., two pretty small-seeded states, not exactly above enumerated under α. I. B or C, are the *F. de calháo*, with small compressed reniform seeds 5 lines long × 3 broad, which are either, 1. light or dark liver-brown with black streaks or stripes, or, 2. black with minute liver-brown specks.

P. multiflorus Willd., DC. ii. 392=*P. coccineus* Desf. ii. 155 (misplaced by DC. amongst the ann. sp.), very distinct specifically by its per. roots, rac. longer than l., very long mostly curved or falcate pods, usually bright scarlet fl., and larger compressed reniform seeds mottled black and flesh-colour, known commonly in England by the name of "Scarlet Runner," and called by the Portuguese Feijõa, is seldom cultivated in Mad., where the roots, reported to be poisonous by authors, are said to be of 7 years' duration.

†††27. Dolichos L.

†††1. D. lignosus L.

Nearly or quite smooth; st. per. suffrutescent woody below, branches twining slender wiry; lfts. glaucous beneath, rhomboidal-acuminate; ped. axillary longer than the l.; fl. in short crowded rac.; rachis, pedic., and bractlets of cal. subpubescent. —DC. ii. 397; Desf. ii. 156.

β. *falcata*; pod curved or falcate.—DC. l. c.; BM. t. 380. *D. lignosus* Holl's List! in J. of Bot. i. 20, 40.—Shr. per. Mad. cult. reg. 1, 2, c. Forming arbours, or in hedges about cottages, especially in the North of the island. Throughout the year.—St. slender but very tough and wiry, thickly branched and intertwining to a height of 10 or 20 ft. forming a close mass. Foliage neat and delicate, bright full gr., lfts. not coriaceous rather small shining. Fl. conspicuous deep rose-purple turning pale lilac as they fade, handsome but not large, scentless in short crowded long-stalked rac. Cal. gibbous or with a little short obtuse knob or spur above at its base, projecting upwards between a pair of minute linear-lanceolate adpressed bractlets; its lobes membranous towards the edges and thickly and shortly ciliate. Standard abruptly reflexed with 2 white parallel arched ribs, each about a line high, at its base attached all their length, the channel between them violet, and each produced downwards into a white stiff fleshy thickened or channeled spur, from which the gr. channeled spur-like claw of the standard arches strongly back. Stam. 1/9. Style flexuose densely bearded upwards on the upper side towards the small but distinctly capitate stigma. Wings rose-purple strongly reflexed and pushed back (not embraced) by the 2 keels or ribs at base of standard. Tip of keel dark atro-purpureous just appearing between the 2 broad deflexed wings. Pod about 1 in. long, ¼ in. broad, slightly falcate flat. Cult. merely as an ornamental pl.

†††28. Lablabia (*Lablab* Adans.).

†††1. L. vulgaris Savi.

Pods broadly scimitar-shaped, the upper suture straight; seeds oval slightly compressed and reniform, *hilum* obtuse at each end. —*Lablab vulgaris* DC. ii. 401. *Dolichos Lablab* L., Brot. ii. 124.

β. *purpurea*; fl. purple.—DC. l. c.; Wight Ill. Ind. Bot. in Hook. Bot. Misc. ii. 352, Supplem. t. 15. *Dolichos Lablab* BM. t. 896; Sm. Exot. Bot. t. 74; Lindl. in Bot. Reg. t. 830. *D. purpureus* Jacq. Fragm. 45, t. 55.

Subv. 1. Seeds dark chocolate or purplish black.
——— 2. Seeds brown or tawny speckled with purplish black.

γ. *albiflora*; fl. white.—DC. l. c.; Wight l. c. 353.
Dolichos Bengalensis Jacq. Hort. Vind. ii. t. 124.

Subv. 1. Seeds yellowish-tawny speckled with dull red or cinnamon.
—— 2. Seeds dull red or cinnamon speckled with yellowish-tawny.

Shr. per. Mad. cult. reg. 1, $\frac{c}{2}$. Fences around cultivated ground or gardens in or about Funchal, Machico, &c. Throughout the year.—A large coarse twining pl. forming thick mats of stout interlacing branches, with habit and foliage of *Phaseolus*. Lfts. ternate rounded-rhomboidal scarcely acute not acuminate, 3–4 in. long and broad, membranous but somewhat coarse and rough or scabrous, slightly pubescent on both sides especially along the veins and edges, rather dull gr. L.-stalks upwards and thick partial stalks pubescent. Stip. and stipels small linear-lanceolate acuminate spreading. Fl. purple in β, in γ. white turning as they fade cream-col., in distinct thickly-clustered whorls on round-stalked axillary 1-leafed erect smooth stiff rac. not longer than their attendant single ternate leaf, which is placed a little way up the stalk of the rac. Pedic. short and, like the cal. and rachis, a little pubescent at first, then smooth. Cal. tubular-campanulate $\frac{1}{3}$, upper lobe broad faintly notched, 3 lower distinct ovate acute; the 2 opposite bractlets at its base as long as its tube, oblong or oblong-oval rather obtuse adpressed deciduous. Standard broad subreflexed, lilac-purple, or in γ. white; 2 upper lobes or appendages at its base oblong spoon-shaped, standing erect and free upwards like a pair of narrow ears, tightly and closely embracing the upper spurs or borders of the wings, as the paler or white 2 lower callosities or appendages, which are indeed merely spurs of the 2 upper, embrace the base of the keel and ovary, the claw of the standard itself arching strongly back from them as in *Dolichos lignosus* L. Wings bright rose-purple or in γ. w., closely adpressed and folding over each other and the keel, to which they also cohere at their base; not at all "spreading" as described by DC. l. c., or reflexed as in *D. lignosus*. Keel quite pale, or in γ. white, abruptly bent up at a right angle, or often less, at the origin of the free part of the stam. Stam. 1/9, the uppermost always in great part cohering to the sheath of the other 9, with its fil. thick or stout and winged or dilated at the base. Style stout compressed pale gr. fringed and bearded upwards on the upper side and velvety-pubescent all round towards the indistinctly capitate stigma. Ov. velvety, slightly hairy along the upper edge, with a very short minute crenate tube (*torus*) sheathing its short stalk. Pods spreading horizontally not pendulous, nearly sessile large broad flat, subfalcate, yet with the upper margin straight, the lower curved, 2½–3 in. long, 1 in. broad,

broadest near the end, the lower margin there curving up abruptly to the short sharp deflexed or hooked point or beak, apparently smooth and shining, but whilst gr. and immature minutely more or less puberulous, and roughened across obliquely with thickly crowded minute raised linear granulations, the upper and in less degree the lower sutural margins being curiously muriculate or verruculate with larger distinct, but still small, sharp points. Ripe pods pale yellowish-brown, altogether smooth and even, with the murication of the sutures indistinct and obsolete or inconspicuous. Seeds 3–5, mostly 4–5, separated by partial incomplete dissepiments, oval, more or less compressed, 5 lines long, 3 broad, 2½ thick, very smooth and glossy but not shining, very variable in colour, with a large long white linear prominent raised bordered spongy *hilum* obtuse or truncate at each end, extending about ⅗ths of its length from the base, or ⅖ths of the whole circumference of the seed.

The foregoing description is taken from the more common purple-fld. var. β; the seeds of which, according to Dr. Wight, are bitter, and but little used for food in India as in Mad.

The white-fld. var. γ. differs in nothing but the lighter- or brighter-col. seeds and fl.; for I find neither the 2 bractlets of the cal. shorter, nor the wings more adpressed than in my var. β,—the latter being in both varr. not only equally adpressed but mutually imbricated, and forming a vault over the keel, whilst the bractlets of the cal. are, alike in both, the precise length of its tube. The seeds of γ. are said by Dr. Wight to be "highly esteemed and much used" in India. In Mad. those of neither sort are held in much repute.

The murications of the sutures are most conspicuous in the gr. or immature pods, and in fact nearly disappear in the ripe fr. Hence perhaps *L. leucocarpos* Savi, or at least its alleged synonym *Dolichos Lablab* Grtn., is not really distinct from var. γ.

†† Suborder II. CÆSALPINIACEÆ.

†† Tribe X. *Cassieæ*.

††29. Cæsalpinia L.

1. C. sepiaria Roxb.

Densely prickly all over, extensively trailing or climbing; l. bipinnate, pinnæ 4–8 pairs, lfts. in about 10 pairs oblong obtuse; rac. terminal erect pyramidal many-fld. velvety-puberulous; pods short broad oblong straight compressed puberulous 6–8-seeded.—Wight and Arn. Prodr. Fl. Ind. Or. i. 282; Wight Ic.

Pl. Ind. Or. t. 37.—Shr. per. Mad. cult. reg. l, $\frac{c}{2}$. Garden walls and fences about Funchal. Almost at all seasons.—An extensively climbing matted very prickly shr., with very long weak trailing angular straight shoots or branches clothed in every part (st., branches, main and partial leaf-stalks) except the rac. with short and small but very sharp and strong hooked prickles, clinging tenaciously to everything touching it. St. and main br. angular smooth; young shoots, buds, and rachis of l. pubescent, more or less ferruginous. L. 6–10 in. long; pinnæ 4 or 5 in. long; lfts. 8–12 pairs, 9 or 10 lines long, 4 wide, smooth dark gr. above, paler beneath. Between each pair of pinnæ a prickle inclining forwards, all the rest being recurved. Rac. pyramidal or oblong 6–12 in. long. Fl. rather large 1 in. diam. lemon-y. scentless. Sep. petal-like presently reflexed, gr. only in the middle, the rest lemon-y. Pet. shortly clawed remote spreading lemon-y.; 4 lower rounded or orbicular entire equal; 5th or uppermost small spreading or reflexed ovate or ovate-oblong, often irregularly plicate at the upper edge, its lower half divergently streaked or spotted with pale reddish or lateritious. Fl.-buds nodding like the fl. and pods, ovoid, compressed, the lowest sep. larger helmet-shaped imbricate over the 4 upper, all velvety-puberulous. Br. and bractlets lanceolate-acuminate leaf-like glandular-ciliate or serrulate velvety-puberulous caducous, falling some time before the expansion of the fl. Pedic. $\frac{3}{4}$ in. (9 or 10 lines) long slender velvety-puberulous and angular like the rachis. Stam. 10 distinct, but combined halfway up by their woolly hairs into a thick pyramidal column; fil. densely villose halfway up with white woolly hairs, their upper free part smooth pale gr. or y.; anth. large orange. Ov. silky. Style thickish gr. as long as the fil., pubescent, smooth and compressed upwards, abruptly truncate and hollow at the tip. Pods rather large broad oblong straight compressed minutely puberulous, 3 in. long, 10 lines broad, simply one-celled and hollow within. Seeds 6–8 roundish or subglobose, slightly compressed, pale olive-brown mottled with darker.

A very handsome climbing shr., admirably adapted for fences or training along the top of walls, forming with its formidable prickles an almost impassable barrier. The seeds were first sent to Mad. by Lady Amherst from the Calcutta Garden about 1824; it is now common in or near Funchal.

†††30. CASSIA L.

§ I. *Chamæfistula* DC. Shrubby. Pod rounded subcylindric indehiscent, many-celled and slightly pulpy within. Seeds horizontal i. e. depressed or flattened vertically.—No

gland at the base of the petiole in any of the following sp.; anthers in all 2-porous.

††1. C. BICAPSULARIS L.

Smooth; lfts. in 3–4 pairs obovate obtuse, the lower rounded with an ovate gland between the lowest pair; rac. axillary short erectcrowded towards the ends of the branches, 3–6- or 8-fld.; pod subcylindric, a little flattened at the sutures, not striated.—DC. ii. 494; Vogel Syn. Gen. Cass. (Berol. 1837) p. 18; Holl! in J. of Bot. i. 21. *C. sennoides* Jacq. Ic. Rar. i. t. 70.—Shr. per. Mad. reg. 1, cc. To the E. of Funchal for the distance of about a mile along the Caniço road, almost clothing the sea-cliffs, and enlivening them with its bright-y. blossoms at most seasons; in similar situations to the W. in several places and amongst beds of *Opuntia* towards Camera de Lobos, &c.; perfectly naturalized, yet not usually producing pods except in the hotter months; and in winter the pl. by their sickly y. foliage and abortive fl. prove themselves to be natives properly of even warmer situations than those to which they are exclusively confined in Mad. Throughout the year.—A rather low shr. not usually above 3 or 4 ft. high, but occasionally, when meeting with support or shelter, rising to a height of 5 or 6 ft. Wood hard and strong. Foliage perfectly smooth and shining, bright- often y.-gr. Branches more or less drooping or declining weighed down by the thick heavy foliage. Lfts. slightly glaucous beneath, somewhat thick and fleshy stiff or coriaceous, very obtuse or rounded at the top with a very minute mucro, the lower smaller shorter and rounder often almost orbicular. Fl. or.-y., in upright axillary stalked rac. 2–4 in. long towards the ends of the branches. Stip. and bracts deciduous flat small narrow-lanceolate, the former spreading horizontally. Pods not often (especially in winter) perfected, 3–4 in. long, 4–5 lines thick, straight or slightly curved, indehiscent, slightly pulpy within, subcylindric, a little flattened at the sutures, and when fully ripe with a faint line or wrinkle of the parenchyme on each side parallel with the suture at about a line in distance from it, otherwise nearly even and not striated across. The sutural diam. is only from $\frac{1}{2}$–1 line less than the dorsal. Seeds depressed and flattened vertically, olive-brown, imbedded in a little greenish sweetish fleshy pulp, which is not however eaten in Mad., as it is said by Schmidt (Fl. Cap. Verd. p. 23) to be in the Cape de Verd Islands. Hence the sp. is misplaced by De Candolle in his section *Chamæsenna*,—belonging by its indehiscent semi-pulpy pods to his former section *Chamæfistula*.

†††2. C. LÆVIGATA Willd.

Wholly smooth; lfts. in 3-4 pairs ovate acuminate smooth and shining, with an oblong-ovate gland between each pair; pod very smooth thick subcylindric subdepressed, the sutures either

plain and simple or impressed, the valves tumid, finely and closely striated transversely.—DC. ii. 491; Vogel Syn. 19.—Shr. per. Mad. cult. reg. 1, cc. In almost every garden about Funchal &c., and often seminaturalized in their neighbourhood in waste ground amongst vineyards, &c. Throughout the year.—A somewhat less bushy lower shr. than *C. floribunda*, 4 or 5 ft. high, with a more distinct st. and very smooth and shining, finely striated, less crowded, thicker or stouter stiffer branches. Wood very hard and firm. Foliage a light shining y.-gr. Stip. none or obsolete. Lfts. larger than in *C. floribunda*, 1½–2 in. long, 1 in. wide, in mostly 4 pairs. Fl. bright golden-y. rather smaller and less numerous in the axillary rac. than in *C. floribunda*, forming stiffer more erect and smaller terminal corymbs. Pod about 3 in. long and ½ in. thick, 4 or 5 times the length of its pedic., very smooth and shining, depressed or flattened in a direction contrary to the usual mode, the sutural diam. being mostly less and never more than half the transverse, owing to the flatness or deep impression of the suture and to the tumidity of the dorsal portion of the valves, which are regularly and distinctly striated across. Seeds and dehiscence as in *C. floribunda*.

3. C. FLORIBUNDA Cav.

Lfts. in 4–5 pairs oval or elliptic-oblong acute, on both sides and especially at the edges, like the petioles and young shoots, minutely pubescent, with an ovate gland between all except sometimes the uppermost and lowest pair; rac. axillary 3–12-fld. forming terminal leafy corymbs; pod 3 times as long as its pedic. subcompressed subquadrangular, the suture raised and margined. —Coll. Mon. 88; DC. ii. 491; Vogel Syn. 19. *C. dispar* Willd. DC. 495?—Shr. per. Mad. cult. reg. 1, c. Gardens and vineyards about Funchal chiefly at and in the neighbourhood of the Quinta do Valle. Throughout the year.—A somewhat bushy shr. 5 or 6 ft. high, at once distinguishable by its rank bituminous smell when bruised or handled. Lfts. in mostly 4 pairs, not all ovate but oblong and of equal diam. across at each end, acute but not at all acuminate, inequilateral unequal at the base, varying in their degree of pubescence but always more or less shortly pubescent especially at the edges. Fl. larger, in larger bunches, and of a much fuller and deeper y. than in *C. lævigata* Willd. Pods about 3 in. long, somewhat 4-sided or quadrangular, with the 2 sutural faces as broad as the 2 dorsal, not channeled but a little raised and even, and separated from the latter by a slight ridge or border; the 2 dorsal faces slightly ridged or striated transversely by the numerous flattened dark-yellowish or tawny-olive seeds; not bursting lengthways, but when very old allowing the seeds to escape by transverse fissures of the thin dry membranous skin when brown and ripe. The seeds, as

in the 2 preceding sp., are flattened vertically or parallel to the transverse partitions, not as usually in *Leguminosæ* laterally or parallel to the valves of the pod.

§ II. *Chamæsenna* DC. Shrubby. Pod compressed dehiscent lengthways, not pulpy within. Seeds horizontal.

†††4. C. TOMENTOSA Lam.

Fulvous-tomentose, the branches velvety ferruginous; lfts. in 4–8 pairs oval oblong more or less obtuse mucronulate densely tomentose beneath, shining and smoothish above, their edges thickened and subreflexed, with a gland mostly between each pair; rac. axillary short corymbose 3–6- or 7-fl.; pod compressed linear-oblong velvety-pubescent.—DC. ii. 496; Vogel Syn. 22. *C. multiglandulosa* Jacq. Ic. Rar. i. t. 72.—Shr. per. Mad. cult. reg. 1, 2, r. Here and there in gardens or about cottages. At the Mount, and at Prazeres, &c., to the westward. Throughout the year.—A bushy shr. 4–6 ft. high, with a distinct st. and handsome foliage. Branches flexuose strongly grooved or ribbed and angular, the younger densely clothed with fulvous ferruginous velvety pubescence like the petioles. Lfts. very dark full shining gr. and minutely downy above, pale and densely ferruginous-tomentose beneath. No gland at base of petiole. Fl. very handsome, rich golden- or or.-y., in stalked axillary close bunches shorter than the l. Pod 3–4 in. long, 4–5 lines broad, straight abruptly beaked or mucronate much compressed or flattened, the sutures slightly margined with a raised hem-like border on each side, quite dry or pulpless within. Seeds numerous horizontal i.e. flattened vertically, tawny or olive-brown.

C. occidentalis L., *C. sulfurea* DC., *C. australis* Sims, and *C. glandulosa* L. or *C. Chamæcrista* L. occur sometimes in gardens about Funchal; and I have myself occasionally raised the first-named sp. from W. I. (Jamaican) seeds. But none of these have ever showed any tendency to become diffused or naturalized.

C. ruscifolia Jacq. Ic. Rar. i. t. 71. (DC. ii. 498), given by its original describer as a Mad. pl., is probably not distinct from *C. occidentalis* L. In foliage it somewhat resembles *C. lævigata* or *C. floribunda*; but it has a wholly different habit, and the petiole is furnished with a gland at its base. The occurrence of Jacquin's pl. in Mad. can have been in any case merely temporary or accidental.

The Judas-tree, *Cercis Siliquastrum* L., remarkable for its simple orbicular-heartshaped l., by which De Candolle considers it allied to *Bauhinia*, though placed by Endlicher at the end of *Sophoreæ*, is a conspicuous and frequent ornament to gardens

about Funchal in March or Apr., forming a tr. 20 or 30 ft. high covered with a profusion of brilliant deep-rose or peach-coloured subpapilionaceous blossoms produced before the new l.

†† Tribe XI. *Ceratonieæ.*

††31. CERATONIA L.

††1. C. SILIQUA L. **Carob-tree** or **St. John's Bread.** *Alfarrôba.*

Unarmed; l. pinnate, lfts. coriaceous broadly oval obtuse flat with waved edges.—Desf. ii. 395; Brot. i. 307; DC. ii. 486; Koch 227.—Arb. per. Mad. reg. l, c. In gardens about Funchal and elsewhere; occasionally in the open country detached tr. here and there seminaturalized.—A large wide-spreading low dark evergreen tr., with a short thick much gnarled and rugged trunk, and long wide-spreading horizontal branches when old; more pyramidal compact and bushy when young. Lfts. in 2–4 pairs, very dark shining gr. above, paler and without lustre beneath, hard stiff and coriaceous, 1½–2½ in. long and 1¼–2 in. broad; their footstalks often reddish. Fl. and pods produced in bunches on short spurs from the thicker branches, and in old tr. even from the st. itself; the former in short rac., but without petals and altogether inconspicuous. Pod dehiscent, 4–6 in. long and ½–¾ in. broad, straight pendulous compressed and flat, but half as thick as broad, with raised tumid margins, very hard and stiff; when ripe containing a fleshy brown pulp smelling like the lees of beer, and 6–10 remote roundish compressed dark-brown seeds.

†††32. GLEDITSCHIA L.

†††1. G. TRICANTHOS L. **Honey Locust-tree.** *Alfarrôba.*

L. bipinnate or pinnate; lfts. linear-oblong subserrulate, sometimes partially combined; pods pendulous membranaceous very long and flat, more or less waved or twisted, many-seeded. —DC. ii. 479.

a. armata; armed with long stout simple or compound spines compressed and 3-fid at the base. *G. triacanthos* Brot. ii. Add. 483; Spr. iii. 918; DC. l. c.

β. inermis DC. l. c.; nearly or quite unarmed.—Arb. per. Mad. cult. reg. l, c. In gardens about Funchal. May, June.—A tall tr. with thin light and elegant deciduous foliage, inconspicuous fl. in short deciduous lateral spikes, and enormously large thin membranaceous shining dark-brown pods, about a foot long and 1½ in. broad, filled with a sweetish peculiar-flavoured pulp. Thorns in *a.* very large and strong, 1–3 in. long, branched at the base, very useful spikes for eating mulberries.

For analogous occasional forms and variations of the l. to those of the present pl. in *G. sinensis* Lam. see DC. Mém. des Légum. pp. 25, 117. t. i.

†† Suborder III. MIMOSACEÆ.

†† 33. Acacia.

††1. A. leucocephala (Lam.). *Arôma branca.*

Unarmed nearly smooth; l. bipinnate, pinnæ in 4–5 pairs, lfts. in 12–15 pairs oblong-linear acute; leafstalk downy with often a gland below the lowest pair of pinnæ; heads of fl. globose axillary stalked mostly in pairs; pod compressed thin, its stalk as long as the peduncle.—Link Enum. ii. 444; DC. ii. 467. *Acacia glauca* Holl's List! J. of Bot. i. 21 (not Willd.). *Mimosa leucocephala* Lam. Dict. i. 12.—Shr. per. Mad. reg. 1, r. Seminaturalized in beds of *Opuntia* above the Gorgulho to the W. of Funchal, and in gardens. Throughout the year.—A low shr. 3 or 4 ft. high. Foliage dark dull gr. Fl. dull creamy or dirty white slightly fragrant. Pods in large bunches very flat and membranous but firm and stiff, about 3 in. long and nearly ½ in. broad, dark brown.

A. dealbata Link, a small tr. remarkable for its very fine and delicate bluish-grey foliage with little golden balls of fl. in axillary panicled rac., and *A. lophantha* Willd., a shr. with dark lurid-gr. foliage and pale whitish crest-like fl., are also commonly cult. The roots in both run near the surface, throwing up suckers, and in the latter sp. they are strongly fetid. *A. verticillata* Willd., *Oxycedrus* Sieb., *longifolia* Willd., *Melanoxylon* R. Br., &c., with many others of the anomalously leaved Australian sp., are also not unfrequent in gardens, &c., particularly at the Mount, Camacha, &c., and like elevations of about 2000 ft., at which most Australian pl. (*Banksiæ*, *Eucalypti*, &c.) best flourish in Mad.

††34. Vachellia Arn.

††1. V. Farnesiana (L.). *Arôma.*

Thorny, spines in pairs short straight divergent stipulary; branchlets flexuose: young shoots, leafstalks, and ped. subpubescent; l. 2-pinnate, pinnæ in 2 or 3–6 pairs, lfts. in 12–24 mostly 14–16 pairs, linear smooth, with a gland below the lowest and sometimes between the uppermost pair; heads of fl. globose axillary 1–3, often in pairs, unequally stalked; pod rounded tapering at each end.—Wight and Arn. Prodr. i. 272; Wight Ic. Pl. Ind. Or. i. t. 300; WB. ii. 122. *Acacia Farnesiana* Willd. DC. ii. 461. *Mimosa Farnesiana* L. Desf. ii. 393. *Mim. cornuta* Bowdich Exc. p. 32.—Shr. per. Mad. reg. 1, cc. Seminatural-

ized in beds of *Opuntia* above the Gorgulho to the W. of Funchal, and in gardens frequent. Throughout the year.—A shr. about 5 or 6 ft. high, remarkable for its straggling stiff dark-brown branches, scanty foliage, small l. and lfts., and copious balls 4–8 lines in diam. on slender pubescent stalks $\frac{3}{4}$–1 in. long of deliciously fragrant golden-y. fl. These retain their very peculiar fragrance even when dry, and are frequently scattered over or amongst clean linen sent home from the wash. Pods smooth dark reddish-brown very hard and stiff, round thick horn-like more or less curved or crooked, sometimes nearly straight, about 3 in. long and nearly $\frac{1}{2}$ in. thick; falcate when young.

†††Order XXVI. AMYGDALACEÆ.

The Almond Family.

Fl. perfect regular. Cal. deciduous; sep. 5 combined into a tube below, not adhering to the ovary, imbricate in bud. Pet. 5 equal deciduous inserted on a disk or ring in the throat of the cal., convolute in bud. Stam. 15–30 inserted with the pet. Ov. a single free 1-celled 2-ovulate carpel. Style 1 terminal; stigma capitate. Fr. a more or less fleshy *drupe*, grooved or furrowed on one side, containing a single hard bony nut or stone enclosing mostly (by abortion of the other) only one seed or kernel with fleshy *cot.*, straight *embryo.* and without *albumen.* —Gum-forming tr. or shr. sometimes spiny, with scaly buds. L. simple stalked. Stip. free deciduous. Fl. w. or pink mostly earlier than the l. Fr. edible. The presence of prussic or hydrocyanic acid in the l., bark, and seeds also characterizes this family.

†††1. AMYGDALUS. Drupe mostly *velvety-pubescent*, rarely smooth, not pruinose; shell or stone *sinuously grooved or rugose.—L. conduplicate.* Fl. earlier than l., w. or pink. (*Amygdalus* and *Persica* Tournef., DC.)

†††2. PRUNUS. Drupe mostly *smooth and pruinose* or covered with a glaucous waxy coat (bloom), sometimes velvety; shell *compressed even*, one edge (the ventral) keeled or grooved.—*L. convolute.* Fl. earlier than l., mostly w. Fr. v.-blue, purple, or y. (*Prunus* and *Armeniaca* Tournef., DC.)

3. CERASUS. Drupe *globose* mostly umbilicated at the base, *smooth, without bloom*; shell *subglobulose*, keeled and grooved on one (the ventral) edge, mostly even on the sides.—*L. conduplicate.* Fl. mostly w. Fr. red, y., or black (atropurpureous).

†††1. AMYGDALUS L.

†††1. A. COMMUNIS L. **Almond.** *Amêndoa*; the tr. *Amendoêira.* L. smooth elliptic-lanceolate serrulate; fl. solitary, cal. cam-

panulate; fr. *oblong or ovoidal compressed* velvety-tomentose, *subbivalve*, gr. when ripe; *flesh thin subcoriaceous*; nut *oblong compressed even* with narrow small fissures.—Desf. i. 393; Brot. ii. 249; DC. ii. 530; Koch 227.—Tr. per. Mad. cult. reg. 1, 2, c. In gardens and about cottages here and there chiefly to the W. of Funchal and below 2000 ft. Fl. Feb., March; fr. July, Aug.—A low somewhat straggling standard-tr. 20–30 ft. high, whitened in early spring almost before any l. appear with large snowy blossoms with a rose-purple eye. Fr. about an in. long, mostly splitting irregularly open longitudinally and exposing the nut, dry and juiceless, with the down adherent. Varr.:

α. alba; fl. snow-w. or pale blush, with often a pink eye. Varies with hard bony or soft spongy friable shells (*Amêndoas durazias* ou *mollares*), sweet or bitter seeds or kernels (*Amêndoas doces* ou *amargas*), and single or double fl.

β. rosea; fl. pink or rose-colour. Subvarr. as in *α*.

†††2. A. Persica L. *Pêcego*; the tr. *Peceguêiro*.

L. smooth elliptic-lanceolate serrulate; fl. mostly solitary; fr. globose with a lateral groove, velvety-pubescent or smooth, indehiscent, y., pale gr., or blush when ripe, mostly bright red on one side; flesh thick juicy; nut ovoidal rough with deep winding grooves and pits.—Desf. i. 392; Brot. ii. 249. *Persica vulgaris* Mill., Koch 227. *P. vulgaris* and *P. lævis* DC. ii. 531.—Tr. per. Mad. cult. reg. 1, 2, ccc. Gardens, vineyards, &c., everywhere, occasionally growing spontaneously. Fl. Dec.–March; fr. July–Sept.—A standard-tr. 20–40 ft. high, the deep pink or rose-coloured fl. appearing before the old l. have fallen, and long before the budding of the new l. L. more shortly stalked than in the Almond (*A. communis* L.). Kernels of fr. bitter, Varr.:

α. Fr. velvety-pubescent. **Peach.** *Pêcego. Persica vulgaris, α, β.* DC. l. c.

Varies, 1) with soft melting flesh separating from the stone (Engl. *Freestones*; Port. *P. mollares*), and these again with mostly w. rarely y. flesh (*P. mollares brancos e amarellos*): 2) with hard crisp flesh closely adhering to the stone (Engl. *Cling-stones* or *Pavies*; Port. *P. durazios*) which are also with w. or more commonly y. flesh (*P. durazios brancos ou amarellos*). The Peaches about Funchal (chiefly hard Clingstones) are generally very bad, and much infested with the larvæ of various *Diptera*. The best of both sorts come from the westward or north, *e. g.* Campanario, Calhêta, Arco de Calhêta, Fajãa d'Ovêlha, &c., or from S^ta^ Anna, S. Jorge, Fayal, &c.

β. Fr. bald smooth. **Nectarine.** *Pêcego calvo. Persica lævis α, β*, DC. l. c.

Much less frequent than *a.* and mostly of very indifferent quality, with hard y. flesh firmly clinging to the stone. The better soft or freestone white-fleshed sorts (*P. calvos mollares brancos*) occur, however, occasionally to the westward ("Tabûa, Logar Debaixo, Arco de Calhêta", &c., Sr. Moniz).

†††2. PRUNUS L.

†††1. P. ARMENIACA L. **Apricot.** *Damasco*; the tr. *Damasquêiro.*

L. smooth orbicular-ovate or oval subcordate acuminate; fl. sessile; fr. velvety-pubescent globose with a lateral groove indehiscent orange-y.; flesh thick juicy.—Desf. i. 393; Brot. ii. 250; Koch 228. *Armeniaca vulgaris* Lam., DC. ii. 532.—Tr. per. Mad. cult. reg. 1, 2, ccc. Gardens, vineyards, &c., everywhere, rarely spontaneously.—Fl. Jan.–March; fr. June, July.—A standard-tr. 20–30 ft. high, distinguishable by the cinnamon-reddish hue of the young l. and shoots. L. firm, smooth and shining. Fl. snow-white appearing before the l. Fr. in Mad. usually small and very inferior in flavour, also, especially if eaten with the rind or skin, apt to cause diarrhœa, but making an excellent preserve. Kernels bitter. The sorts chiefly cult. are *Damascos legitimos* ou *Alperches*, *D. brancos*, *D. churros* ou *Albricoques*, *Maracotões*, *Francézes*, &c. The *Damasco prêto*, Purple Apricot or Apricot-plum (*A. dasycarpa* Pers.), known by its small round velvety v.-purple plum-like fr., also now and then occurs.

†††2. P. DOMESTICA L. **Plum.** *Ameixa*; the tr. *Ameixicira.*

Branches without spines, always smooth; l. lanceolate-ovate, a little pubescent beneath; ped. mostly pubescent and in pairs; cal. velvety within.—Desf. i. 394; Brot. i. 250; EB. t. 1783; Sm. E. Fl. ii. 355; Hook. Sc. i. 150; DC. ii. 533; Koch 228. *P. communis* γ. Bab. 89.—Tr. per. Mad. cult. reg. 2, ccc. About cottage-fields and gardens, everywhere from 1000–3000 ft. Fl. April, May; fr. June, July.—A small standard tr. 15–20 ft. high with white fl. appearing together with or a little before the young l.

a. Fr. oblong; Subv.: 1) fr. v.-black, *Ameixa prêta*, c; 2) fr. purple-r., *Am. incarnada*, cc; 3) fr. y., *Am. amarella*, c; &c.

β. Fr. globose; Subv.: 1) fr. v.-black, sweet, *Abrunho*, in fl. at P^to^ da Cruz and Arco de S. Jorge in the north, March, cc; 2) fr. purple-red, crisp-fleshy, *Ameixa Inglêza*, Orleans Plum, c; 3) fr. y.; 4) fr. y.-gr., *Ameixa verde* ou *Rainha Claudia*, Green Gage, r; &c.

I must leave other Mad. botanists to determine whether,

amongst some perhaps of the above recorded subvarr. of β. or otherwise, I have not overlooked *P. insititia* L., distinguished according to authors from *P. domestica* L. by its velvety-pubescent greyish young shoots or branches, l. downy beneath, finely pubescent ped., cal. smooth and subgranulated within, and always globose red or y. fr. It is the common wild Bullace-plum of England, EB. t. 841.

3. Cerasus Juss.

§ Fl. in umbellate fascicles or bunches, earlier than the l. L. deciduous.

†††1. C. Avium (L.). **Cherry.** *Cerêja* (the tr. *Cerejêira*).

Arboreous; l. oblong-obovate abruptly acuminate *drooping sharply serrate pubescent beneath*; umbels sessile lax crowded round the leaf-buds; scales of fl.-buds all scarious not leafy; *calyx-tube contracted at top*, sep. entire; fr. heart-shaped-globose sweet.—*Prunus Avium* L., Desf. i. 394; Brot. ii. 252; Koch 229; Bab. 90. *P. Cerasus* EB. t. 706; Hook. Fl. Sc. i. 150 and Brit. Fl. (ed. 5) 92; Sm. E. Fl. ii. 354 (not Linn.). *Cerasus Avium*, *Duracina* and *Juliana* DC. ii. 535, 536.

β. *Juliana* Koch l. c.; fr. moderately large heart-shaped black, red, or yellowish, flesh soft moderately firm not acid.—*C. Juliana* DC. ii. 536.—Tr. per. Mad. cult. reg. 2, ½. Chiefly to the W. of Funchal, Rib. Brava and Serra d'Agoa, Canhas, Calhêta, &c., about cottages. Fl. April; fr. June, July.—This, the common cultivated garden Cherry, forms in Mad., as elsewhere, a mostly pyramidal tr. 20–30 ft. high, with upright or ascending branches, and rather large white fl., appearing with the l. "Outer scales of the leaf-buds deflexed" (Bab.). Fr. subglobose full bright-red sweet, on stalks 1½–2 in. long. Subvarr.: 1, *Cerêja incarnada*, Early Red, ripe in June; 2, *Cerêja prêta*, Black, immediately succeeding.

Var. γ. *Duracina* Koch (*C. Duracina* DC. ii. 535), the White Heart of the English, and Bigarreau of the French, with large y. heart-shaped very firm crisp-fleshed fr., has not occurred in Mad.

†2. C. vulgaris Mill. *Ginja* (the tr. *Gingêira*).

Fruticose and stoloniferous; l. broadly oblong-obovate or oval doubly crenate-serrate smooth not drooping; umbels sessile few-fl. scattered; inner scales of fl.-buds leafy; calyx-tube not contracted at the top, sep. crenate-serrate; fr. globose.—Mill. Dict. no. 1. *C. Caproniana* DC. ii. 536. *Prunus Cerasus* Linn.; Brot. ii. 251 (at least in part); Koch 229; EBS. t. 2863;

Bab. 90. "*Prunus austera* Ehrh. and *P. acida* Ehrh. Beitr. vii. 129 and 139" (Koch).

Var. *rustica*; fr. subsolitary on rather short stiff stalks globose rather large dark dull blood-red approaching to black (atropurpureous), the flesh red, neither acid nor very juicy, slightly bitter.—Shr. per. Mad. reg. 2, §. Fences of upland cottage-fields or gardens, on hill-sides, &c., from 1500 to 2500 ft.; Camacha, Curral das Freiras, Serra d'Agoa, &c., general. Fl. April, May; fr. July, Aug.—A low shr. rather than tr. throwing up suckers abundantly from the roots. St. short and indistinct or several irregularly branched from the base, with straggling spreading or declining branches; rarely more than 10–15 ft. high, often considerably less. Fl. like those of the Common Cherry (*C. Avium* L.) w., appearing rather with than before the l. Fr. nearly the size of a Morella Cherry, which it resembles equally in shape and colour; its flavour rather peculiar, slightly bitter, yet agreeable, and, though rather insipid and not distinctly acid or very juicy, making a most excellent preserve. Fr.-stalks about an in. long.

A cognate var. from the same stock as our common English Morella Cherry (*C. Caproniana θ. griotta* Ser. in DC.), which, although much less acid and juicy, it resembles in lateness of season, succeeding at not less interval than a month or two the common "Cerêja" in Mad. (*C. Avium* L.). Though often growing apparently quite wild, and always without culture, it has probably been originally introduced from Portugal.

§. Fl. in racemes coætaneous with the l. Tr. or shr., in Mad. sp. evergreen with persistent coriaceous l.

3. C. LUSITANICA (L.). **Portugal Laurel.** *Gingêira brava.*

L. ovate-lanceolate or ovate-oblong, acuminate serrate without glands; rac. axillary straight loosely spreading longer than the l. *Prunus lusitanica* Linn.; Brot. ii. 252. *Cerasus lusitanica* Ser. in DC. ii. 540.

β. *Hixa* Ser. in DC. l. c.; l. narrower and longer oblong abruptly acuminate; rac. elongate with laxer fl.—*Prunus Hixa* Brouss. ex Willd. *Prunus lusitanica* Buch 197. no. 381. *Prunus* (*Padus*) *lusitanica* WB. ii. 19. *Cerasus Hixa* WB. t. 38.—Tr. per. Mad. reg. 2, 3, rr. Almost extinct now in a wild state, but undoubtedly indigenous. Thirty years ago I found a fine tr. in full vigour in the forests of the Serra d'Agoa under Pico Grande, and on the path leading down to the bottom of the valley from the Caminho Central about a mile nearer the Jardim; also I have seen it in the Curral das Freiras on the right hand high above the road going down the Voltas; Rib. de São Martinho, a branch of the Rib. de João Gomes, near

Funchal, Sr. J. M. Moniz. This last habitat precisely accords with that assigned by Masson (in BH.) long ago, "ad ripas rivulorum Curral dos Romeiros." The tr. at the Palheiro are affirmed by the old gardener to have been all brought thither originally from the Santo da Serra; and those at the Mount, in the grounds of the Quintas do Bello Monte and de Prazer below the church, are doubtless, from their size and age, of the native stock. Old stumps of this tr. are met with occasionally in various other places. July, Aug.—A large tr. 40–60 ft. high, with a distinct trunk sometimes 6 ft. in circumference, and a close bushy head of dark shining evergreen foliage; loaded profusely with long rac. of white fl. with a yellowish eye, hanging or spreading loosely, and almost weighing down the branches. Besides the great difference in habit from the low rounded stemless form, branched from the base of the pl., in English shrubberies and gardens, the l. are more oblong narrower and more pointed (about 5 in. long by $1\frac{1}{2}$ broad), and the fl. less crowded on the rac., which are 6–8 in. long. Fl. strongly but not agreeably fragrant. Berries passing through red to nearly black, not poisonous, but scarcely wholesome or palatable, though occasionally eaten by children.

The wood of Las Mercedes near Laguna in Tenerife is chiefly composed of this tr., not attaining, however, nearly the size it reaches in Mad. I found it in full fl. in July.

The common "Laurel" (properly Cherry-laurel, *Prunus Laurocerasus* L.) of English shrubberies and gardens, which also belongs to this section of *Cerasus*, thrives well in Mad. in pleasure-grounds and gardens, principally at a height of 1500–2000 ft., and especially at the Palheiro; but it is by no means general or common.

Order XXVII. ROSACEÆ.

The Rose Family.

Fl. mostly perfect regular, rarely imperfect. Cal. persistent not adhering to the ovary; sep. 5–4 or 10–8, valvate in bud. Pet. 5–4 or 0 deciduous, inserted on a disk or ring at the base of the sep., imbricate in bud. Stam. indefinite inserted with the pet. Ovaries free. Carpels distinct indefinite, sometimes reduced to 1–2, mostly 1- rarely 2–many-ovulate. Styles mostly lateral and free, rarely connate. Fr. various, composed of the dry or drupaceous and juicy, 1-seeded and indehiscent distinct carpels, forming a head on the receptacle, or enclosed within the hardened or fleshy cal.-tube. Seeds exalbuminous; cot. fleshy; embryo straight.—Shr. or per. herbs. L. mostly compound, pinnate. Stip. united to the petiole, persistent. Fl. w., pink, or y. coætaneous with the l. Fr. often edible.

Tribe I. *SANGUISORBEÆ.*

The Burnet Tribe.

Fr. formed of 1 or 2 rarely 3 or 4 dry distinct indehiscent 1-seeded carpels or ach. enclosed in the dry hardened rarely fleshy cal.-tube which is contracted at the top. Cor. often 0. —Mostly per. herbs with l. pinnate or palmate. Fl. inconspicuous small. Fr. insignificant small, not edible.

1. POTERIUM. Fl. polygamous irregular. Cal. 4-cleft, its tube turbinate bracteolate. Pet. 0. Stam. 20–30. Styles terminal 1–2 rarely 3. Stigmas tuft- or brush-like. Carpels (ach.) 1–2 rarely 3 enclosed in the dry corky rugose or scrobiculate cal.-tube. Seed suspended.—Herbs per. L. odd-pinnate; lfts. stalked serrate. Fl. and fr. in dense globose or short oblong heads or spikes, scentless.
2. BENCOMIA. Like *Poterium*, but tube of cal. in fr. even and somewhat fleshy, st. shrubby, and fl. in long cylindric spikes.
3. AGRIMONIA. Fl. perfect regular. Cal. 5-cleft, its tube turbinate without bractlets, 10-grooved, armed upwards with hooked bristles, in fr. hard and woody with the sep. connivent. Pet. 5. Stam. about 15 inserted with pet. above the glandular ring contracting the throat of cal. Style terminal; stigma small subbilobed. Ach. 1–2 enclosed in the hardened woody obconic setose cal.-tube. Seeds suspended.—Per. herbs, with interruptedly odd-pinnate l. and small y. fragrant fl. in spikes or rac.
4. ALCHEMILLA. Fl. perfect irregular. Cal. 8–10-partite double, the outer row of alternate segments smaller, tube urceolate contracted at the throat. Pet. 0. Stam. 1–4 inserted on a ring in the throat of cal. opposite its outer smaller segments. Style lateral from nearly the base of the ov.; stigma capitate. Ach. 1–2 enclosed in the dry hardened naked cal.-tube. Seed upright or ascending.—Inconspicuous herbs, per. or ann. L. palmately lobed or cut. Fl. greenish small inconspicuous.

Tribe II. *DRYADEÆ.*

The Raspberry and Strawberry Tribe.

Fr. (an *etærio*) composed of several or many small dry or (in *Rubus*) succulent indehiscent carpels or ach. inserted on a dry or (in *Fragaria*) succulent receptacle. Cal. persistent below the fr. Stam. indefinite numerous.—Per. herbs or shr. with compound l. Fl. conspicuous.

5. Potentilla. Cal. flat open cup-shaped double 5+5-rarely 4+4-partite, the outer segments smaller. Pet. 5 rarely 4 broadly rounded or heart-shaped. Stam. many. Style lateral short deciduous. Fr. dry of many small ach. placed upon a flattish convex hairy dry recept. Seed pendulous.—Mostly per. herbs or $\frac{\text{Shr.}}{2}$. L. compound. Fl. y., sometimes w., r., or atropurpureous, mostly cymose.

6. Fragaria. Cal., cor., and stam. as in *Potentilla*. Pet. 5 obovate. Style lateral marcescent. Fr. succulent composed of many hard dry carpels or ach. seated on an ovoidal or globose succulent or juicy deciduous recept. Seed pendulous.—Stoloniferous per. herbs. L. trifoliate. Fl. w. Fr. edible fragrant r. or w.

7. Rubus. Cal. flat open cup-shaped simple 5-partite. Pet. 5. Stam. many. Style nearly terminal marcescent. Fr. juicy composed of several or many succulent distinct or subconfluent drupes seated on a convex or conical spongy soft or dry recept. Carpel hard bony wrinkled. Seed pendulous. —Shr. with prickly mostly rampant st. and leafstalks. L. palmate or pedate. Fl. w. or rose, paniculate. Fr. mostly scentless, often edible, black or dark v.-blue, rarely red or pale ochraceous-w.

Tribe III. *ROSEÆ*.

The Rose Tribe.

Fr. (a hep, *cynarrhode*) composed of many indehiscent dry hard bony 1-seeded carpels or ach. enclosed in the enlarged fleshy or pulpy cal.-tube, which is crowned with the persistent sep.—Prickly shr. with pinnate l. and large conspicuous fragrant fl. Fr. scentless scarcely edible.

8. Rosa. Cal. simple 5-fid, tube urceolate contracted and annularly callous at the mouth, lined with bristles; sep. in bud subspirally twisted, often pinnate. Pet. 5 spirally imbricate in bud. Stam. many. Styles lateral free or united upwards. Carpels or ach. numerous small bony inserted on the inside of the cal.-tube.—Stip. attached to petioles. Fl. w., r., pink or purple, rarely y., often (by cult.) double. Fr. red, rarely black.

Tribe I. *Sanguisorbeæ*.

1. Poterium L.

1. P. verrucosum Ehrenb.

Herbaceous more or less hairy-pubescent; st. angular, hirsute

downwards; rachis of lower l. and lfts. beneath hairy-pubescent; lfts. sharply inciso-serrate, the lower roundish, the upper oval or ovate-oblong; heads solitary subglobose, fl. all perfect except a few of the lower; fil. scarcely longer than the spreading or reflexed subpersistent sep.; fr. large oval strongly and coarsely muricate-lacunose or reticulate-rugose.—Ehrenb. Ann. des Sci. iii. 263; WB. ii. 9. *P. megacarpon* Novit. 22 or 544. *P. Sanguisorba* Buch 197. no. 374 (not Linn.).—Herb. per. Mad. reg. 1, 2, c. Dry sunny hills, waste rocky places and road-sides, chiefly near the sea, everywhere; all about Funchal, along the Caniço road, W. bank of the Roxinha, &c., about S. Martinho, Pico da Cruz and P. de S. Antonio to the W., &c.; not often seen above 1000 ft. April–June.—Wholly without scent or flavour. Root strong tough woody. Fl.-st. about a ft. high, the branches slender stiff and somewhat straggling. Foliage rather dull gr., sometimes glaucescent, very variable in pubescence, rarely altogether smooth. L. 3–6 in. long odd-pinnate, the lower pubescent, upper nearly or quite smooth. Lfts. in 5–7 or 8 pairs, nearly sessile, sharply but coarsely or deeply serrate, the lower on the rachis small and irregularly placed, upper 5 or 6 lines long, 3–5 broad. Heads of fl. subglobose or hemispherical on long naked ped. (the ultimate branches of the st.), gr. not atropurpureous. Anthers pale ochraceous, with short pale slender flexuose fil. Stigmas short and small, deep-crimson. Cal.-lobes mostly 4, large broad oval smooth, not falling till the fr. is ripe. Fr. coated with the hardened adherent spongy deeply pitted cal.-tube, pale ochraceous or cream-colour, 2 lines long and nearly as broad, 2 or 3 times as large as in *P. Sanguisorba* L., oval not quadrangular, and with the prominent raised walls or edges of the pits irregularly jagged or toothed. Nut almost always single, ovate-globose, not angular, obsoletely rugulose, dark brown or black.

Entirely devoid of the peculiar grateful cool Cucumber-like smell and flavour of its near ally *P. Sanguisorba* L., which in old times in England, until the introduction of the modern Cucumber, rendered the last-named pl. of such repute.

2. BENCOMIA Webb.

1. B. CAUDATA (Ait.).

Shrubby dioecious without spines, hairy-pubescent or villose; young shoots, ped., petioles, rachis and lfts. beneath shaggy or villose; l. odd-pinnate in terminal tufts; lfts. in 4–6 pairs, oblong-ovate acute sharply serrate, glabrescent or smoothish above, whitish and villose beneath; stip. irregularly lacerate-pinnate; spikes axillary thick cylindric elongate cernuous or

nodding, lax downwards and mostly branched or compound.—WB. ii. 11. *Poterium caudatum* "Ait. Hort. Kew. iii. 354;" BM. t. 2341 (female pl.); DC. ii. 594.—Shr. per Mad. reg. 2, rrr.

Male pl.—A single ex. only, in the upper part of the grounds or chestnut-woods of the Quinta de Prazer below the Mount Church, formerly occupied by the late Robert Page, Esq.; cult. April, May.—A shr. about 5 or 6 ft. high, with long sparing straggling naked thickish very brittle branches full of pith, covered with a shining even greyish outer skin cracking or peeling off, leaving them cinnamon or chesnut-brown beneath, each terminating in a large thick tuft or rose of l. The older branches are quite woody and stiff but remarkably brittle, snapping short off with the slightest force from their large quantity of pith. New shoots, petioles and rachis of l., and ped. densely villose or shaggy with long white somewhat woolly hairs. L. not deciduous, but when dry and withered continuing in thick masses several years below the fresh ann. tufts of gr. l. at the ends of the branches. Base of petioles dilated sheathing broad and membranous, pale or whitish, fringed with hairs, short and ending abruptly upwards on each side in a small narrow laciniate stipulary lft., with several pairs of similar stipulary lfts. close together downwards, quite towards the base of the sheathing portion and apart from the upper terminal pair; all distinguished from the true lfts. by their pale colour, narrowness, and deeply jagged laciniate or lacerated outline. Lfts. in 4–6 mostly 5 pairs with an odd one, the lowest smallest and remote, all ovate-lanceolate equally serrate glabrescent or nearly or quite smooth and dark shining gr. above; beneath pale whitish opake and villose-pubescent, the hairs short close and inclining or almost adpressed, with prominent equidistant nerves. L. 6–12 in. long; lfts. $\frac{1}{2}$–$1\frac{1}{2}$ in. long, $\frac{1}{4}$–$\frac{1}{2}$ in. broad. Spikes on axillary solitary erect stout villose stalks aggregate in the terminal tufts of l., and mostly branched or compound, producing below the main spike several smaller lateral spikes; the main spike cylindrical, as thick as the little finger and 4–6 in. long, the end drooping in bud, mostly erect altogether in fl., of a pale light gr. more or less pale ochraceous according to the state of the anthers. Fl. densely crowded upwards, lax or remote downwards; bracts 3 rather large and conspicuous (exactly as figured in the female pl. BM., t. 2341) ovate-acuminate spreading silky-villose. Sep. pale gr. with whitish edges, broadly oval or roundish, concave at first, soon strongly revolute instead of reflexed, as rightly figured l. c. in the *female* pl., quite smooth. Anth. about 40 large roundish and flattened, pale ochraceous. Pollen issuing like a cloud of dust when the spikes are first shaken. Fil. extremely fine and delicate.

The above description was taken in April 1831 from a shr.

stated to be the remains of a tr. full 20 ft. high and with a trunk as thick as a man's thigh. This tr. had been accidentally broken down some years previously, owing to its extreme fragility; and all that remained were shoots from the old stock or root, forming a large spreading straggling bush with remarkably brittle branches, snapping short off with the slightest force, and of a dry quite woody substance, but with a large pithy cavity inside. This individual still (1861) exists, growing close below the upper boundary wall of the Quinta de Prazer, dividing it from the Q. do Bello Monte above.

Female pl.—Rocks in the Curral das Freiras, April, May, 1861; brought by a countryman to Sr. Moniz, from whom I have received excellent dried spec.—Habit exactly of the male pl., but in these ex. much less hirsute or rather merely subpubescent; the upper surface of lfts., sep., and fr. quite smooth. L. odd-pinnate stalked, 3 or 4 in. long. Lfts. in mostly 4 or 5 pairs, ovate- or elliptic-oblong acute, sharply strongly and regularly serrate, quite smooth above, pale or subglaucous beneath and pubescent like their petiol. and rachis, ½–1 in. long, half as broad. Stip. with small irregular leafy lacerate or laciniate *pinnæ* or lfts. Rac. axillary in the terminal bunches of l., slender, slightly drooping, 3–4 in. long, a little shorter than the l., stalked, sparingly branched or compound at the base. Fl. distinct numerous but not crowded, nearly or quite sessile. Bractlets 3 ovate or lanceolate acuminate membranous puberulous persistent, nearly or quite half as long as the fr. Cal.-tube 1½ line long, half as broad, elliptic-oblong subquadrangular (the angles presently obliterated) perfectly smooth and even. Sep. about half the length of cal.-tube, broadly oval or oval-oblong, gr. with thin pale edges, subpersistent smooth. Stigmas 3 forming a short thick (in these dried spec. pale brown) tuft about half the length of sep. Fr. resembling a very small young gooseberry, reddish or purplish-brown globosely turbinate, approaching more or less to oval or elliptic, fleshy, hard or firm, quite smooth and even, about 2 lines long and half as broad, mostly crowned by the persistent spreading or reflexed sep. and containing 2 or mostly 3 carpels or ach., each enclosing one brown seed.

In BM. t. 2341 the stigmas are bright crimson, and the 3 styles are much longer and more distinct than in my dried spec., which are however all rather in fr. than fl.

The claim of this pl. to be regarded as indigenous to Mad. remained until very lately unsupported by any direct evidence. It was first discovered by Masson in Tenerife, where it is now

extremely rare, and where I only once met with it, in the summer of 1858 at the head of the Barranco de S. Andrés, halfway between Laguna and Taganana, growing out of a perpendicular wall of rock by the roadside, without fl. or fr. But neither Masson nor any subsequent botanist, till quite recently, had ever found it wild in Mad. Nevertheless, in accordance with the line of reasoning followed with regard to *Rhamnus latifolia* Herit. *supra* p. 112,—viz. the little intercourse between the Canaries and Mad., the want of any other instance of such introduction thence in former years, the improbability of exception in the case of a pl. neither useful nor ornamental, and lastly the positive tradition on the spot that the male pl. growing in the Quinta de Prazer had been "brought from the Serra," —I had all along regarded this cult. ex. as the relic of a truly indigenous Mad. sp., which possibly might still reward the researches of some future botanist, but which, if really become totally extinct—a condition which the dicœcious nature and probable original rarity of the pl. might well have accelerated,—had but anticipated by a few years, like *Rhamnus latifolia* Herit., the probable speedy destiny of *Visnea Mocanera* L. fil., *Pittosporum coriaceum* Ait., *Prunus lusitanica* L., *Picconia excelsa* (Ait.), *Taxus baccata* L., *Juniperus Oxycedrus* L., *Goodyera macrophylla* Lowe, *Luzula Seuberti* Lowe, *Balantium Culcita* (Sw.), *Lycopodium complanatum* L., and other like serviceable or excessively rare and local pl. The question is however now completely settled by the late happy discovery of a female pl. on its native rocks in the Curral, due to the unflagging energy of Sr. Moniz,—a discovery not less important in itself than in the confirmation it affords to the legitimacy of the claims of one or two other more or less apparently extinct sp. (e. g. *Centaurea Massoniana* Lowe, and *Rhamnus latifolia* Herit.) to a place in the Mad. Flora.

3. Agrimonia L.

1. A. Eupatoria L. **Agrimony.** *Amoricos.*

Villose-hairy; l. interruptedly pinnate; lfts. hairy or shaggy beneath, ovate-oblong coarsely serrate; cal.-tube in fr. obconic, ribbed or furrowed to the base, outer spines of its rim or top spreading.—Brot. ii. 292; EB. t. 1335; Hook. Fl. Sc. i. 147; Sm. E. Fl. ii. 346; Buch 197. no. 375; DC. ii. 587; Koch 245; WB. ii. 14; Seub. Fl. Azor. 48. no. 362; Bab. 91.—Herb. per. Mad. reg. 2, 3, ccc.—Chestnut-woods, ravines on grassy banks,

and roadsides, everywhere above 1000 ft. July–Oct.—Wholly scentless. Root strong woody. St. 1–2 ft. high stiff straight erect, mostly simple, leafy downwards, ending in a long erect virgate spike of distant nearly sessile scentless rather small paley. fl., much elongated in fr. L. about 4 in. long, with 3 or 4 principal pairs of nearly sessile lfts. and an odd stalked terminal one about 1 in. long and $\frac{1}{2}$–$\frac{3}{4}$ in. broad, hairy but not glandular beneath, above pubescent; the rachis with a number of much smaller irregular intermediate sessile lfts. Stip. large leafy stem-clasping coarsely serrate like all the lfts. Sep. connivent in fr., acute. Pet. flat oblong, soon falling. Tube of cal. hairy-pubescent or shaggy, strongly 10-ribbed or grooved nearly or quite down to its base; outer spines of its rim short and spreading at most horizontally, not deflexed, inner longer, ascending or erect; all hooked at the tip, giving the hard dry fr. a bur-like character.—Used remedially by the country people.

4. ALCHEMILLA L.

§ *Aphanes* L.; alternate teeth of cal. very small; pl. ann.

1. A. ARVENSIS (L.).

L. stalked palmate trifid fan- or broadly wedge-shaped, hairy beneath, lobes 2- or 3–5- or 6-toothed; fl. sessile agglomerate opposite to the l., sheathed by the large stem-clasping stip.—"Scop. Carn. i. 115," DC. ii. 590; EB. t. 1011; Hook. Fl. Sc. i. 56; Sm. E. Fl. i. 224; Koch 257; WB. ii. 12; Bab. 92. *Alchemilla Aphanes* Desf. i. 145; Brot. i. 159. *A. vulgaris* Holl! in J. of Bot. i. 21, 40 (not Linn.). *Aphanes arvensis* L.—Herb. ann. Mad. reg. 2 (upper part) and 3, c. Mountain pastures in the short turf almost everywhere, as about the Primeira Vista do Curral above the Jardim da Serra, the Lagôa at S. Antonio da Serra, above Camacha towards Pico das Aboboras, towards the Pico do Areeiro, &c., and rocky banks along the Levada in the Rib. da Metade, at the Rabaçal, &c. April–June.—A small inconspicuous hirsutely pubescent pl., nearly hidden in the mountain turf, with minute scentless greenish fl., and small elegantly shaped foliage. St. prostrate or procumbent, 2–6 in. long with a knotted or jointed appearance. L. flat, fan-shaped, small, as broad as long. Stip. large leafy deeply cut, meeting round the st. and concealing or sheathing the fl. Fl. very small gr. in little hairy tufts, opposite the l., not axillary, nearly or quite concealed by the stip. Cal. tubular-urceolate angular with 4 larger ovate inner, and 4 minute alternate outer segments.

Tribe II. *Dryadeæ*.

5. Potentilla L.

* Hairs of recept. shorter than the smooth carpels.

1. P. procumbens Sibth. *Solda.*

More or less hairy, st. flagelliform prostrate or procumbent, rarely rooting; lower stip. simple entire, upper 2–3-cleft; l. all stalked, subpedately quinate or ternate, obovate-wedgeshaped, sharply and deeply toothed above the middle, below entire; fl. mostly tetramerous, pet. obcordate with a very short claw; carp. obliquely 3- or 4-ribbed or wrinkled on each side.—"Sibth. Fl. Oxon. 162"; Koch 239. *P. nemoralis* Nestl. Pot. 65. *P. Tormentilla* ε. *nemoralis* Ser. in DC. ii. 574; Seub. Fl. Azor. 48. no. 359. *P. Tormentilla* β, Bab. 94. *P. reptans* Buch 197. no. 380 (not Linn.). *Tormentilla reptans* L., Sm. EB. t. 864; E. Fl. ii. 428; Hook. Fl. Sc. i. 164.—Herb. per. Mad. reg. 2, 3, ccc. Bare open mountain pastures and thickets, chestnut-woods, &c., everywhere chiefly from 1500–5000 ft. Throughout the year. —Very variable in size and luxuriance. Rootstock stout somewhat woody blackish. St. runner-like weak and slender branched dichotomously, either quite prostrate or trailing loosely and ascending amongst other herbage, 3–12 in. long; only occasionally and after fl. rooting at the joints. Stip. leafy often small or inconspicuous. L. always distinctly stalked. Lfts. 3–6 or 9 lines long, stalked, often smooth above, but always hairy beneath along the nerves and edges; coarsely serrated above the middle with a few lanceolate acute teeth. Fl. bright y. on long slender stalks from the axils with a leafy palmate-cleft br., intermediate in size between the fl. of *P. reptans* L. and those of *P. Tormentilla* Sibth. Pet. 4 very rarely 5. Sep. 8 very rarely 10, linear-lanceolate, as long as the pet., unequal, the outer or alternate narrower or smaller. Recept. hairy. Carpels smooth, with 3 or 4 faint indistinct oblique ribs or wrinkles towards the top on each side.

No pl. can be more constant in its char. than this is in Mad.; and I have seen no symptoms whatever of transition either towards *P. Tormentilla* Sibth. or *P. reptans* L. I consider it a good sp., agreeing therein with most of the older and one at least of the best modern practical working botanists, Koch, whose excellent observations on it I transcribe: "It differs from *Potentilla reptans* in the sharp lanceolate more spreading teeth of the l., in the mostly tetramerous fl., and in the carpels rugose on the back with a few tubercles, and not merely tuberculate; from the following, i. e. *Potentilla Tormentilla* Sibth., in the stalked

l., the smaller stipules, the fl. twice as large, but especially in its mode of propagation: for the st. in autumn put out roots from the joints with a bunch of l. and then decay, leaving alone the rooted joints which form so many distinct pl." (Koch 240.)

I still possess a spec. of a small dwarf state of this pl. gathered in July 1828 "in montosis Maderensibus" by my late friend Webb, and named by him *Potentilla verna*.

"*P. anserina* L." Holl's List, in J. of Bot. i. 21, 41, is doubtless a mere slip of the pen for the present pl. not otherwise mentioned by him, but which could not possibly have escaped his notice. The true *P. anserina* L. is certainly not found in Mad. Seubert mentions it, however, in his *Flora Azorica* as common in dry pasture-ground and by roadsides in the Açores.

Potentilla reptans of Buch's List is likewise a plain pen-slip for *Tormentilla reptans* L. or the present pl., which it is remarkable has not been found in any one of the Canarian Islands, though it occurs in the Açores. Mad. thus appears to be its southern limit.

6. FRAGARIA L.

Strawberry.

1. F. VESCA L. **Wood Strawberry.** *Morângo.*

Lfts. membranous soft hairy, the 2 lateral subsessile; hairs of petioles and ped. spreading, of pedic. adpressed upwards or erect; sep. in fr. spreading or reflexed; fr. globose or ovate, not contracted or barren at the base.—Desf. i. 402; Brot. ii. 349; Buch 197. no. 379; Hook. Fl. Sc. i. 162; EB. t. 1524; EBS. t. 2742; DC. ii. 569; Sm. E. Fl. ii. 414; Seub. Fl. Azor. 48. no. 357; WB. ii. 13; Koch 234; Bab. 95.—Herb. per. Mad. reg. 2, 3, ccc. Chestnut-woods, banks and mountain slopes, especially in thickets of *Vaccinium*, everywhere from 1500–4000 ft.; abounding particularly on the heights above the district of Porto da Cruz, and in the Valleys of Rib. Frio, Rib. da Metade, Rib. do Fayal and S. Vicente. Fl. throughout the year, chiefly in early spr.; fr. April–July.—A small humble sparingly stolon-bearing gregarious pl. nearly concealed amidst surrounding herbage. Fl.-st. short erect 2–6 or 8 in. high scarcely or little higher than the l., bearing scarcely more than 2–4 small white fl. L. mostly radical stalked; lfts. hairy-pubescent of a soft texture, obovate-cuneate coarsely serrate, bright gr. above, whitish or a little silvery beneath; the middle one subpetiolate, the side ones more or less sessile. Stolons few and short, seldom more than a ft. long, produced from the root-stock after fl. Fr. small globose or ovate-globose not con-

tracted at the base, deep scarlet or blood-colour; the carpels all smooth and even, continued down quite to the base of the receptacle.

The fr. is collected mostly by the children of the country-people, especially those of the Porto da Cruz district, and brought for sale in Funchal early in the morning daily during the season in small baskets neatly covered with chestnut-leaves, their contents being sold for from "half a bit" ($2\frac{1}{2}d.$) to twice as much each. The supply is most abundant in May and June. The fr. though small and acid is remarkably high-flavoured, especially late in the season.

The ordinary English varr. of Garden Strawberry are also cultivated in the neighbourhood of Funchal and elsewhere from 1000–2000 ft. above the sea; *e. g.*, the Roseberry, Kean's Seedling, Black Pine, Carolina, Chili, &c., but not the Old Scarlet (*F. virginiana* Mill.) or the Hautboy (*F. elatior* Ehrh.). Of these the white or blush-coloured Chili Strawberry (*F. Chilensis* Ehrh. var. [*β. ananassa* Duch?]) thrives apparently the best, the fr. attaining an unusual excellence and flavour.

I have a note of a *Fragaria* gathered at the Mount in May 1828, with "sep. erect after flowering," and so referred by me at the moment to *F. collina* Ehr., but which was probably a mere aberrant *F. vesca* L. However the true *F. collina* Ehr. with sep. close-pressed to the fr., and the latter contracted and barren, *i. e.* without carpels, at the base, should be also carefully looked for in Mad.

7. Rubus L.

Bramble, Blackberry, or Raspberry.

* Shrubby; barren st. of year (*y.-st.*) arched or declining, often rooting at the end.

1. R. **discolor** W. and N. **Common Bramble.** *Silvado.*

Y.-st. arched, rooting at the end, angular furrowed and like the petioles *minutely stellately downy* and very prickly; prickles large compressed declining or deflexed from a long base; lfts. 5-nate or 3-nate all stalked ovate-oblong acuminate, sharply and finely but unequally serrate and plaited at the edges, *hard and coriaceous, glazy-white and closely tomentose beneath*; *pan. long narrow, its branches equal short few-fld.*, the lower remote axillary, upper crowded 2–3-fld. corymbose, all naked (without glands or *setæ*) but minutely stellately downy and *armed with*

numerous strong hooked prickles; *pedic. and cal. closely tomentose naked* unarmed, sep. reflexed; pet. *roundish-obovate* clawed *twice the length of sep.*—Weihe and Nees Rub. Germ. t. 20; Bab. (ed. 4) 99. *R. fruticosus* L., Desf. i. 401 (var.); Brot. ii. 347; EB. t. 715; Buch 197. no. 377; Hook. Fl. Sc. i. 160; Sm. E. Fl. ii. 399; Bab. (ed. 1.) 94; Hook. E. Fl. (ed. 5) 96; Seub. Fl. Azor. 48. no. 355. *R. fruticosus a. major* WB. ii. 15. *R. fruticosus* 1, Koch 233.—Shr. per. Mad. reg. 1, 2, 3, ccc; PS. reg. 1, rrr; GD. reg. 2, rr.—In Mad. everywhere below 4000 ft., and forming the ordinary fences to vineyards, fields, cottage gardens, &c.; in PS. only near the large tank or fountain at the W. end of the town, forming a hedge in a lane leading northwards; in GD. up the central valley here and there on the mountains. Fl. March–Sept; fr. July–Oct.—St. unless supported nearly or quite prostrate all their length, rooting and then arching only towards their end; otherwise (as in hedges) 5–8 ft. high, numerous, shooting up successively year after year from the rootstock; dark-reddish-purple, naked or without glands and setæ, and appearing smooth but meally or powdery, as if mouldy, from the very minute short close-pressed stellate hairs; clinging tenaciously by the very sharp and numerous large compressed strong and rigid prickles with which the whole pl., except the ped. and cal., is beset. Lfts. stalked, distinct, not laterally imbricate, dark shining gr. and smooth above, strikingly white and covered with a close hard glazy stellate-downy coat beneath, but not otherwise hairy, except that the downy coat is somewhat looser or freer on the main ribs; all oblong more or less, and of a stiff dry substance, with finely serrate full or plaited often deflexed edges, the terminal or middle lft. largest and longest, abruptly acuminate with the point bent downwards or decurved, 2–3 in. long and $1\frac{1}{4}$–$1\frac{1}{2}$ broad. Cancellating or reticulating cross-veinlets on the under surface of the lfts. very regular distinct and prominent. *Stip. seated a little way up the petiole above the axils*, long linear-subulate erect. Pan. prickly leafless, in fr. elongate cylindric. Fl. about the size of a shilling or nearly an inch in diam., uniformly in Mad. as in the Canaries different shades of lilac-rose or pink, varying much in intensity from deep full pink to the faintest blush, but never white. Pet. obovate, attenuated at the base. Sep. cottony-w., reflexed in fl. and fr. Fr. shining black, of many grains or drupes, juicy and sweet.

Luxuriant pl., growing in moist or shady spots, have sometimes the hard close *tomentum* beneath the lfts. greenish and inconspicuous, though still discernible with a good lens; and the lfts. are less coriaceous and not discolorous, or dark gr. above and white beneath.

The Portuguese have a prejudice against the fr. (*Amoras*

da silva) as indeed against the Mulberry, deeming it unwholesome. It yields however a fair substitute for English Currant-jelly.

This troublesome and far too common pl. is very valuable for fencing purposes, and it is not less universally employed thus in Mad. than in the Canaries. Its all but absolute exclusion from Porto Santo seems therefore the more remarkable.

The fossil leaves figured and described by Dr. Heer in his very valuable and interesting Memoir on the Fossil Pl. of S. Jorge (4to, Zurich, Nov. 1855), p. 28. t. ii. f. 1, 2, under the name of *Corylus australis*, appear to be impressions of the under surface of terminal lfts. of *R. discolor*. On the other hand fig. 3, by its freer coarser larger serrature and absence of cancellating or reticulating cross-veinlets, is rather an impression of the upper surface of a lft. of *R. grandifolius*.

2. R. CONCOLOR Lowe.

Differing from *R. discolor* in its smaller or more slender and less stout, straighter and declining rather than hooked and deflexed prickles, in its lfts. (coriaceous) being merely somewhat paler gr. and more or less pubescent but not at all or very seldom closely tomentose- or glazy-*white* beneath, in its more numerously fld., broader or larger and closer often corymbose panicles, in its dull w., not in the least pink or blush, pet. or fl., and drier insipid fr., with rather fewer and larger grains or drupes.—Shr. per. Mad. reg. 3, rr. Thickets of *Vaccinium*, Heath, and *Laurus* by the roadside between the Paul da Serra and the Cruzinhas on the road to Seixal or Porto Moniz, for about a mile before reaching the Cruzinhas. Also in thickets about half a mile below the Tanquinhas, on the ascent to the Paul from S. Vicente. June, July.—Perhaps only a local form of *R. discolor*, due to the high elevation (scarcely below 4000 ft.), or shady humid nature of its place of growth. I know no other sp. however, except indeed its apparently still nearer ally, *R. rhamnifolius* W. and N. (EBS. t. 2604), with which it can be properly compared; and I must therefore commend it to the careful study of Mad. botanists on the spot, to determine whether it really is distinct from both *R. rhamnifolius* and *R. discolor*, or whether, if not the former sp., it is a mere sylvan state or form of the latter. The arched barren y.-st. with its l. precisely resembles that of *R. rhamnifolius* as figured in EBS. t. 2604.

3. R. GRANDIFOLIUS Lowe. *Silvado da Serra.*

Y.-st. arched angular furrowed and, like the petioles and partial leaf-stalks, *perfectly naked smooth* and very prickly;

prickles very numerous compressed strongly hooked, declining or deflexed from a long base; lfts. quinate, rarely ternate, *subpedate* oval or ovate-oblong acuminate, coarsely *doubly-serrate, soft and membranous, quite smooth and naked on both sides, bright gr., scarcely paler beneath;* partial l.-stalks *long, the 2 outer combined at the base;* pan. *large elongate oblong compound downwards, its rachis and branches thickly clothed with purple or reddish glandular hairs or setæ, with here and there a fine small prickle;* pedic. and cal. *similarly glandular-hairy,* unarmed; sep. reflexed; pet. *obovate-oblong* obtuse, shortly clawed, *at least 3 times the length of sep.*—Prim. 32. *R. pedatus* Sol. MSS.!; Buch! 197. no. 378 (non Sm.).—Shr. per. Mad. reg. 3, and upper part of 2, c. Wooded banks and thickets; first ravine W. of the Allegria above S. Roque near Funchal; Rib. das Caiadas; Cêrca at S. Antonio da Serra; above the Quinta at the Jardim da Serra; in Rib. Frio, Rib. da Metade, Serra d'Agoa, Rib. de S. Jorge, and all the principal ravines of the North. Fl. June–Sept.; fr. Aug.–Oct.—Altogether vastly larger than the common Bramble (*R. discolor* W. and N.), with much longer stouter arching y.-st., often 20 ft. long, rising high over the surrounding bushes, magnificent large bright-gr. foliage, and immense pan. of large snow-white fl. St. mostly gr. or only reddish-purple here and there, the strong vigorous y.-st. very stout and thick, much elongated, angular and furrowed but not deeply; all armed on the angles with numerous, rather small or slender, deep-red or purple hooked compressed prickles, by which they catch and cling tenaciously; altogether smooth and shining, the fl.-st. only towards the pan. becoming sprinkled with short red or purple glandular hairs. L. with long smooth shining very prickly stalks, bearing 5, or upwards close below the pan., 3 or 4 lfts. or even only 1. Lfts. very large, the terminal one being often 5 or 6 in. long and 3 or 4 broad, the whole 5 forming a circle often 2 or 3 ft. in circumference; all on long very prickly stalks, that of the largest terminal lft. being from 1–3 in. long, those of the four or two lateral lfts. shorter, and always in the quinate l. the stalks of the two side-lfts. are more or less, sometimes very distinctly, combined at the base; the lfts. a little heart-shaped at the base, and with a finely acuminate point; of a thin, not at all stiff substance, shining bright full gr. on both sides, being scarcely paler beneath, and seldom at all dark above, quite smooth and naked on both sides, but with several small fine prickles on the midrib beneath, and with the cancellating cross-veinlets of the under surface obsolete indistinct irregular remote and inconspicuous; the edges coarsely but distinctly doubly-serrate, the serratures altogether larger and freer than in *R. discolor.* Stip. leafy stalked narrow lanceolate finely acuminate erect or erecto-patent, mostly quite entire, rarely remotely toothed, *seated at the base of the leaf-*

stalk, pale gr., sometimes a little hairy. Pan. a foot or more long, many-fld., with subdivided branches. Br. linear or lanceolate pale gr. glandular-hairy. Fl. pure but dead white, very large and handsome, when fully open about the size of a dollar or nearly 2 in. in diam., fragrant. Sep. reflexed in fl. and fr., ovate acuminate concave, without prickles but copiously glandular-hairy, pale gr. with whitish edges. Pet. large, with a short claw, very fugacious. Fil. white. Anth. pale greenish-y. Styles greenish. Fr. large oblong subcylindric obtuse, about ¾ in. long, of numerous small equal-sized grains or drupes, more like a Raspberry than Blackberry, deep shining black, rather firm hard dry or juiceless, and either acid or insipid. When half-ripe it is of a peculiar bright mulberry-red colour. The ripe fr. is longer and more obtusely pyramidal or cylindric, with much more numerous and smaller grains, of a firmer drier substance, less juicy and more acid, than in the common Blackberry (*R. discolor* W. and N.); and it is, when ripening, of a much brighter red colour.

"*Ulmus suberosa* Mönch" of Heer's Fossil Pl. of S. Jorge, p. 28, t. i. f. 24, is the impression of a side-lft. of this *Rubus*; and not only t. ii. f. 3, of "*Corylus australis*," but his "*Psoralea dentata* Dec.?" p. 33, t. ii. f. 28, are also, most probably, impressions of the upper surface of side-lfts. of the same, the "little points" or dots of the latter exactly corresponding with impressions of the fine granulations or ultimate reticulate compartments on the upper surface of the lfts. of either *R. grandifolius* or *R. discolor*.

It is fair to state, however, that as *Ulmus campestris* L. (*U. suberosa* var. Ehrh., Moench) flourishes cult. at an elevation of 3000 or 4000 ft. at Osorio near Teror and at San Matéo in Grand Canary, there is no strong *à priori* reason against its former existence in Mad., though at present it is cultivated with small success at Camacha or the Mount, scarcely exceeding the size of a dwarf tr. or bush.

The Raspberry (*R. Idæus* L.) is occasionally cultivated; but it is with difficulty preserved alive for more than two or three years, even at the elevation of the Mount, and is very unproductive from the first.

Tribe III. *Roseæ.*

8. Rosa L.

Rose.

§ Leaves and shoots without glands or *setæ*.

a. Styles distinct.

1. R. CANINA L. *Rosa brava.* **Dog Rose.**

Branches naked smooth; prickles uniform strong hooked compressed remote or scattered; lfts. 5, 7, 9, subcoriaceous, mostly smooth and naked without glands, simply or doubly serrate; stip. adnate persistent; fl. aggregate; sep. pinnatifid deciduous.—DC. ii. 613; Koch 250; Bab. 112; Brot. ii. 340 (in part); Lindl. Ros. Mon. 98; Hook. Fl. Sc. i. 157 (in part); Hook. Br. Fl. (ed. 5) 106; Sm. E. Fl. ii. 394; WB. ii. 16.

a. glabra Desv.; petioles with a few scattered prickles, nearly or quite smooth; lfts. naked and quite smooth, keeled, simply serrate, elliptic-ovate or oval, more or less pointed at each end; pedic. and ovate fr. quite smooth.—DC. l. c. *R. canina a,* Lindl. Ros. l. c.; Hook. Br. Fl. l. c.; Bab. l. c. *R. canina a. vulgaris* WB. l. c. *R. canina* EB. t. 992.—Shr. per. Mad. reg. 2 (upper part) and 3, $\frac{1}{2}$. Ravine W. of the Allegria near Funchal; ravines between Camacha and S. Antonio da Serra; descent from the Mount into the Rib. de S^{ta} Luzia; about the Primeira Vista do Curral and the Jardim da Serra; plentifully in the upper part of S. Vicente and of the ascent to the Paul da Serra below the Tanquinhas; Rib. Frio, da Metade, &c. June, July.—Almost precisely the genuine common English Dog Rose with more or less pale-pink- or blush-coloured fl., in Mad. always nearly white, with the faintest tinge possible of blush, and fragrant. Upper or flowering branches only here and there or not at all prickly. Lfts. mostly shorter broader and rounder or less elliptic than in the English pl., being rarely twice as long as broad, often much less, and scarcely or not at all pointed at the base; very smooth and shining, full gr., a little paler beneath, not in the least glaucous or pubescent; their serratures simple erect, subconnivent upwards. Styles short, distinct to their very base, sometimes quite smooth, sometimes villose-hairy, and thus not confirming a remark of Dr. Lindley (Rosar. Monogr. 103) quoted in Hook. Fl. Scot. 158, to the effect that, the further to the south the pl. is found, the smoother are its styles, and that they are entirely without hair in Madeira. So in another var. (*R. canina γ. Armidæ* WB. ii. 16, which is very nearly if not quite identical with *R. sarmentacea* Woods, EBS. t. 2595 = *R. canina β*, Hook., Bab., &c.) which I found

abundantly in the woods ascending to the Cumbre in the Island of Palma, one of the Canaries, on the new road (Camino nuevo) from S^ta^ Cruz de la Palma to La Banda, in full fl. at the beginning of June, 1858, at a height of 3000 to 4000 ft., the styles vary in different fl., even on the same branch, from quite smooth to villose-hairy.

††2. R. LÆVIGATA Mich. *Rosa Mosquêta.*

Branches naked smooth long and trailing; prickles uniform strong hooked compressed scattered; lfts. 3 coriaceous naked, without glands, very smooth and shining, simply serrate; mid-rib, rachis, and petioles prickly; stip. free setaceous or subulate, deciduous; fl. solitary; sep. simple acute or with a spathulate tip; fr. oblong orange-red, and with the pedic. thickly echinate. —Mich. Fl. Bor.-Am. i. 295; Lindl. Ros. Mon. 125; DC. ii. 600. *R. nivea* α, DC. ii. 599. *R. sinica* Ait. Hort. Kew. ed. 2. iii. 261 (not Linn.) ex DC.; Lindl. Ros. Mon. 126, t. 16; BM. t. 2847. *R. ternata* Poir. Dict. vi. 288 ex DC.—Shr. per. Mad. reg. 1, ccc. About Funchal on walls and arbours, straggling often into waste ground, everywhere; forming a beautiful and frequent covering to graves in the English cemeteries. May, June.—Erroneously called in Mad. "the Macartney Rose." Yearly shoots often of great length, 12–18 ft. or more, simple prostrate or trailing. L. evergreen. Lfts. ternate hard and stiff. Fl. single large, fully 3 in. in diam., delicate pure white, scentless. Fr. very singular with its horizontal but not pungent spines standing out all round like those of the husk of a Spanish Chestnut (*Castanea vesca* Grtn.).

b. Styles combined.

†††3. R. MULTIFLORA Thunb. **The Bramble Rose.** *Rosa de toucar.*

Branches naked smooth very long and trailing; prickles uniform, rather small or slender, hooked compressed scattered; lfts. 5 or 7, without glands, soft pubescent, smoother shining and rugulose above, elliptic-ovate, simply and finely serrate; rachis and petioles prickly, softly and thickly hairy; stip. adnate persistent pectinate-toothed hairy; fl. in thick crowded corymbose pan., small, very numerous; branches of pan., br., pedic. and cal. pubescent; fl.-buds globose-ovate; sep. "ovate entire" (Lindl.).—"Thunb. Fl. Jap. 214; Willd. ii. 1077; Ait. Hort. Kew. ed. 2. iii. 265" (ex Lindl.); DC. ii. 598.

γ. *carnea* Red. and Thor.; fl. pink, double.—DC. l. c. *R. multiflora* BM. t. 1059; Lindl. Ros. Mon. 119.—Shr. per. Mad. reg. 1, 2, ccc. In fences by roadsides and near cottages and houses everywhere, growing without any culture as if wild. May, June, but partially till Oct.—Yearly shoots often of pro-

digious length, 20–30 ft., simple arched or trailing. L. evergreen. Lfts. soft, thickly hairy-pubescent beneath. Fl. about an in. in diam., of a lovely delicate pink or rose-colour, but nearly or quite scentless, produced in vast profusion in thickly crowded terminal corymbs all over the pl., very double, and yet with well-formed stigmas, but never fertile or producing fr.

The comparatively scentless common Pink China or Everblowing Rose (*R. indica* L. *a*, DC.) called by the Portuguese "*Rosa Ingleza*," and the old English cottage-garden semi-double very fragrant deep blush-pink Damask Rose (*R. damascena* Mill. *γ*? DC.), with running roots, and gr. stems, called "*Rosa Portugueza*," both occurring everywhere in gardens, are also often seen in hedges and waste ground on the outskirts of enclosures about houses, growing wholly without culture.

The other sp. seen most commonly cult. in gardens are the Tea Roses (*R. indica* L. *δ*, DC.); the small dark blood-red or atropurpureous Everblowing Rose "*R. do Rato*" Port. (*R. indica* L. *θ*, DC., *R. semperflorens* Curt. BM. t. 284, *R. Bengalensis* Pers. and Holl's List in J. of Bot. i. 21, 41); the white Rose-Unique (*R. centifolia* L. *γ*, DC.); the old English pink Moss-rose "*R. de Musgo*" Port. (*R. centifolia* L. *ε*, DC.); the common white or Maiden-blush (*R. alba* L.); the White Lady Banks's (*R. Banksiæ* R. Br.); the old double dark blood-red and semi-double Red or striped red and white York and Lancaster Roses "*R. de Alexandria*" and "*R. raiada de Alexandria*" Port. (*R. gallica* L., Buch 197. no. 376; *R. gallica* varr. 1, 2, 3 Brot. ii. 342, 343; *R. gallica δ*, *ε**, and *ε*, DC. = *R. gallica β*, BM. t. 1794), and the curious scentless *R. microphylla* Roxb. BM. t. 3490, with muricate fr. and Briar-like foliage. Many other sp. and varr. also occur. But these, like *R. sulphurea* Ait. with its fine large double y. fl., and *R. moschata* Mill. (*R. de Mosquêta*) with its large ample panicles of delicate pure white semi-double fl. possessing a most delicate though not powerful fragrance, are comparatively rare, and are entirely confined to a few gardens about Funchal or Quintas in the country.

Prof. Lindley (Ros. Monogr. 122) says of *R. moschata* Mill., "This is one of the few sp. found in the N. of Africa, extending across the continent from Egypt to Mogadore and thence to Madeira, whence it was brought by Sir George Staunton, and by him communicated to Mr. Lambert." And he proceeds to speak of it as "found wild" in Spain, though it has little of the habit of a European Rose. In Mad. it is certainly not indigenous, and is indeed only a rare inmate of gardens, showing no tendency whatever to become naturalized or even common.

Order XXVIII. POMACEÆ.

The Pear and Apple Family.

Fl. perfect regular. Cal. persistent, sep. 5 imbricate in bud, tube adhering to the ovary. Pet. 5 (rarely 0) imbricate in bud. Stam. 15–30 inserted with pet. in the throat of cal. Ovary of 5–1- mostly 2-ovulate cells or carpels coherent with each other and with the cal.-tube. Styles as many as carpels, stigma simple. Fr. a 5- or 1–4-celled *pome* or apple, fleshy or succulent, crowned with the persistent sep. Seeds 1–2 (rarely more) in each cell with a cartilaginous or bony *endocarp*, ascending; cot. mostly flat simple; albumen 0.—Tr. or shr. with scaly buds. L. mostly simple sometimes pinnate. Stip. free mostly deciduous. Fl. w., blush, or pink, mostly earlier than the l. Fr. edible.

1. CHAMÆMELES. Cal. truncate *minutely 5-toothed*, tube urceolate. Pet. 5 erect *crumpled and erose*. Style 1. Ov. 1-celled, each cell containing 2 erect ovules. Fr. (a *Haw*) obovate or oval, crowned by the withered sep., umbilicate but closed at top and concealing the upper end of the single *bony 1-seeded* nut or carpel. Cot. *leafy convolute*.—L. simple coriaceous evergreen.

2. PYRUS. Cal. 5-fid or 5-toothed, tube urceolate. Pet. 5 *suborbicular*. Styles 5–2. Ov. 5–2-celled, each cell 2-*ovulate*. Fr. fleshy umbilicate at top but closed and crowned with the dry persistent sep.; cells 5, each 1–2-*seeded formed of the cartilaginous or coriaceo-membranous endocarp*. Coat of seeds (*testa*) *cartilaginous*; cot. fleshy *plain simple*.—Small tr. L. simple or pinnate deciduous. Fl. in umbellate bunches w. or rose, often fragrant. Fr. mostly edible.

††3. CYDONIA. Cal. 5-cleft, the *segments almost leafy*, tube *campanulate*. Pet. 5 suborbicular. Styles 5. Ov. 5-celled, each cell *many-ovulate*. Fr. fleshy closed umbilicate, crowned by the *enlarged* persistent sep.; cells 5 cartilaginous, each *many-seeded*; seeds *mucilaginous* subhorizontal; *testa* cartilaginous; cot. simple.—Shr. with simple l. and subsolitary fl. Fr. mostly pear-shaped cottony.

1. CHAMÆMELES Lindl.

1. C. CORIACEA Lindl. *Buxo da Rocha.*

The only sp. of its genus.—Lindl. in Tr. Linn. Soc. xiii. 104, t. 11; Lowe ibid. xvi. pp. 393–396; DC. ii. 631; Spr. Syst. ii. 460. *Cratægus coriacea* Sol. MSS. in BH.; Buch 197. no. 382.—Shr. per. Mad. reg. 1, rr. Sea-cliffs and perpendicular sides of ravines on the S. coast, almost exclusively in the neighbourhood of Funchal, and never above a mile or two from the sea. Edge of the cliffs along the Caniço road to the E.

half a mile out of Funchal. Rib. de João Gomes, about halfway up from the Roxinha to the bridge across its stream in the Curral dos Romeiros. Second ravine beyond the W. end of the Praia towards Camera de Lobos, and on the W. side of the Porto Novo Ravine between Caniço and S^ta^ Cruz, along the Levada about 2 miles up, Dr. C. Lemann. Fl. Dec.–March, mostly Dec., Jan.; fr. Dec.—A low bushy shr. 3–5 ft. high, having somewhat the form or aspect of the *Pyrus japonica* Hort. (*Cydonia* Pers., DC., *Chænomeles* Lindl.), or still more of the Pomegranate (*Punica Granatum* L.), with the shining foliage and bright-reddish or flame-col. young shoots and l. of the latter. Branches strong stiff woody but rather brittle, with a smooth greyish ash-col. bark. L. evergreen coriaceous hard stiff and brittle, spathulate or retusely obovate, attenuated into their short stalks, faintly or obscurely and remotely crenate, dark shining gr. above, pale and slightly glossy beneath, altogether smooth, solitary and alternate only on the young shoots, soon becoming clustered by development of secondary leaf-buds on the spurs and older branches. Stip. extremely minute and inconspicuous, short lanceolate reddish and certainly not deciduous. Fl. white racemose, with a strong disagreeable smell resembling somewhat that of the fl. of the Barberry (*Berberis vulgaris* L.). Rac. terminal on short lateral leafy shoots or spurs along the whole length of the previous 1- or 2-year-old branches, 2–4 in. long erect with a few small l. downwards and 6–15 fl. on short upright pedic.; the rachis and pedic. like the young shoots and l. with a few scattered hairs. Pedic. with several short subulate reddish minute bracts. Sep. short minute, reddish in the bud, downy inside. Pet. rather small roundish with a rather long abrupt claw, much crumpled and jagged or erose, white, with the claw and a stripe up the outside of each (especially in the bud) bright red; in the expanded fl. horizontal and remote, being separated by a space as wide as the breadth of each pet. Stam. 10–15 inserted in a simple ring close to the base of the pet. about halfway down, at first bent in over the style, afterwards erect; fil. white smooth as long as the pet.; anth. large at first pale y., then brownish. Style short; stigma subcapitate dilated lobed margined. Ov. obovate downy at top fleshy with 2 hard oblong erect ovules close together in the centre. Fr. (a *Haw*) rarely matured and very long in ripening, much resembling that of the common Hawthorn (*Crataegus Oxyacantha* L.) but a little more oblong or elongated and of a rich cream-colour or pale yellowish-white, $\frac{3-4}{8}$ in. long, $\frac{2-3}{8}$ in. broad, oblong-turbinate or globosely oblong and somewhat pear-shaped, flattened or truncate at top with a small hollow in the centre which is nearly concealed by the converging dry and blackened sep., altogether smooth and shining. Flesh about $\frac{1}{16}$ in. thick, mealy insipid but slightly bitter, white when first

cut or broken, but changing almost immediately to reddish-rusty-brown if the cut or fracture be transverse, not otherwise. Nut hard bony even, not rough or furrowed, with a slightly prominent suture up one side, ovate or elliptic, one-celled, containing a single loose narrow-elliptic kernel invested with a thin light-brown skin. Kernel pale-greenish internally; its cotyledons foliaceous, beautifully convolute, appearing in a transverse section like 2 leaves or laminæ rolled together spirally.

The fl. are produced profusely, but are rather dull and inconspicuous, the light-gr. cal.-tube or germen and anthers predominating over the small remote white wrinkled pet. Notwithstanding their profusion, very few fr. attain maturity, and that only after a very long period. In one instance the fr. of Dec. fl. remained in June in the same gr. immature but full-grown state which they had attained in March, and did not ultimately ripen till Dec. following, *i. e.* a full year after their first formation. The convolution of the cotyledons has supplied an interesting fact in confirmation of the close alliance of this tribe of *Rosaceæ* to *Calycanthaceæ* (and so to *Granataceæ*) indicated long ago by Dr. Lindley. See Linn. Trans. ll. cc. This connexion with *Granataceæ* (the Pomegranate) is curiously borne out externally by the habit and foliage.

"*Buxo*" is properly the common garden Box (*Buxus sempervirens* L.), and is only occasionally or conventionally applied to the present pl. with the distinctive epithet "*da Rocha*."

The Medlar (*Mespilus germanica* L.), "*Nesperêira*" of the Portuguese, occurs here and there in gardens above 1500 ft., but is rare. The Japan Medlar or Loquat [*Eriobotrya japonica* (Thunb.)] "*Nespera de Japão*," introd. about 30 years ago, is now common, producing abundantly its gratefully acid amber-col. fr., which is about the size and shape of a walnut, from Nov. to April, from the level of the sea to 3000 or 4000 ft.

2. Pyrus L.

Pear and Apple.

†††1. P. communis L. **Pear-tree.** *Perêira.*

L. simple ovate serrulate more or less downy beneath, smooth above, petioles about the length of the l.; fl. in simple corymbs; ped. and cal. smooth or pubescent; styles distinct; fr. turbinate, sometimes nearly globose, not umbilicate at the base.—Desf. i. 397; Brot. ii. 328; EB. t. 1784; Sm. E. Fl. ii. 361; DC. ii. 633; Koch 260 (var. *a*); Bab. 114.

γ. *sativa* DC. ii. 634; unarmed.—Tr. per. Mad. reg. 2, ccc.

Commonly cult. everywhere, but principally in the parish of Caniço and the Valley of Machico. Fl. Dec.–Apr.; fr. July–Sept.—A pyramidal tr. 20–40 ft. high. L. mostly quite entire, smooth and shining when adult. Fl. snow-white scentless, appearing just before the l. Fr. very variable in size, shape, colour, flavour and season, but mostly more or less attenuated into the footstalk and not umbilicated at the base.

The pears in Mad. are in general of indifferent quality, and even the best English sorts become stony, dry and flavourless. The sorts most esteemed or commonly cult. are, according to Sr. Moniz, *Pêras Flamengas, P. de Refêgo, P. Bojardas, P. Carvalhaes, Bergamotas, Furneiras, Formigas, Saramanhas, Quanquans,* &c., with upwards of 20 others.

†††2. P. MALUS L. **Apple.** *Perêiro* or *Macêira.*

L. simple ovate shortly or abruptly acuminate crenate or obtusely serrate, white and tomentose beneath, petioles not half the length of the l.; buds tomentose; fl. in sessile umbels, ped. and cal. tomentose, styles combined downwards; fr. globose umbilicate at the base, fleshy, mostly sweet.—Brot. ii. 329; DC. ii. 635. *P. Malus β. tomentosa* Koch 261; Bab. 114. *Malus communis* Desf. i. 398.—Tr. per. Mad. reg. 2, ccc. Everywhere cult. in gardens. Fl. March, April; fr. Aug.–Oct.—A low spreading tr. 15–30 ft. high, with a strong branched root. Young shoots, l. beneath, and cal.-tube downy or cottony. Fl. blush-pink in bud and on first opening, fading into nearly white, fragrant. Fr. never hard, harsh, or austere, mostly depressedly globose and even hollow at the crown, always more or less umbilicate at the insertion of the usually short footstalk.

Even the best English sorts (such as the true Golden Pippin, introduced by a former British Consul Mr. Veitch, and thriving well at the Jardim) retain their excellence for a short time only after being gathered: and the generality of Apples in Mad. may be pronounced of very inferior quality. The best (*Pêros finos*) are the *Maçãas Barraes* (a large much depressed golden-y. apple), *Reinetas, Cara de Dama, Pino d'ouro,* &c. Other inferior sorts of more common occurrence are *Pêros de vime, P. dos Canhas, d'estôpa, batoques, doces,* &c.

Without personal study and investigation it may seem rash, in opposition to the stream of most practical botanists, to endorse the idea of De Candolle, that the original stock of the garden Apple (*P. Malus* DC.) is specifically distinct from our common English wild Crab (*P. acerba* DC., *P. Malus a,* Koch and Bab. ll. cc., *P. Malus* EB. t. 179). It may serve however

to confirm this view, that the former tr. appears to extend much further south than the latter, which certainly is totally wanting, either wild or cultivated, in both the Madeiran and Canarian Archipelagos, as, from Brotero's *Flora Lusit.*, it also seems to be in Portugal. Whether the nearly sessile fr. of the former, contrasted with the long-stalked fr. of the wild Crab (*P. acerba* DC.) and certain garden Apples (*e. g.* the Golden Pippin) possibly derived from it, might not also, in addition to the lanuginose young leaves and germens, indicate a specific difference in the original stocks, is a further question. There is certainly an appreciable difference in the mode of growth or ramification, as well as in the habit of the two plants.

3. P. Aucuparia (L.). **Mountain Ash** or **Rowan-tree.**

L. pinnate, lfts. serrate nearly smooth; buds, young l., and shoots downy, hoary; fl. in broad compound corymbs or corymbose panicles; fr. globose.—Gaertn. Fruct. 45, t. 87; Hook. Fl. Sc. i. 151; Sm. E. Fl. ii. 364; DC. ii. 637; Hook. Br. Fl. 110; Bab. 114. *Sorbus Aucuparia* L., Brot. ii. 298; EB. t. 337; Koch 262.

β. Maderensis; shrubby low bushy leafy; l. short, lfts. often subobtuse; pan. short subsessile buried in the l. erect in fl. and fr.; fl. fragrant.—Shr. per. Mad. reg. 3, rrr. In close thickets of *Vaccinium* at a height of 5500 ft. from 500 to 100 yards below the Icehouse of the Pico do Areeiro, on the left-hand of the road or path where it passes along the N. side or base of the last conical peak 500 yards to the S.E. of the Icehouse, and down the last little valley crossed immediately before arriving at the same; Sept. 1838, June 1844, about 20 tr. or bushes. Serra de S^{ta} Anna towards Pico Ruivo, Sr. J. M. Moniz, 1855. Fl. June; fr. Sept.—Rather a shrub than tr., with numerous erect straight st. or suckers from the rootstock forming a thick bush, and not rising above 6–8 ft. in height, though the main st. are often as thick as the arm or leg. L. scarcely more than 3 or 4 in. long. Lfts. in 6 or 7 pairs with an odd one, oblong, often rather obtuse, about 1 in. long and ½ in. broad, somewhat stiff or rigid, evenly serrate, shining dark gr. above, paler and slightly pubescent on the midrib beneath, the main and partial l.-stalks being also, with the rachis (which is furnished with a gland at each pair of lfts.), slightly downy. Buds, ends of young shoots, and l. beneath greyish-downy, the latter not cottony beneath. Fl. pure white with a delightful fragrance as agreeable and powerful as that of the common Hawthorn (*Crataegus Oxyacantha* L.), in dense many-fld. short-stalked large ample terminal corymbose panicles. Branches of corymb, pedic. and cal. downy. Pet. concave. Stam. incurved. Styles very

uniformly 4. Teeth of cal. inflexed in fr. Ov. mostly 3-celled. Fr. (wrongly called "berries") bright scarlet or orange-red, apple-shaped *i. e.* globose and level or flattish at top, the size of large peas or about $\frac{3}{8}$ in. in diam., in corymbose *erect* panicles shorter than the l., with a nauseous slightly bitter taste, mostly only 1-seeded. Seed small compressed brown.

Almost precisely the genuine Mountain Ash of England, Wales, and Scotland, with exception only of the shorter pan. more imbedded or embosomed in the l., and perfectly erect, not drooping or weighing down the branches, both in fl. and fr.,—characters which are however quite in conformity with the smaller or shorter l. and more thickly-leafy dwarfish stunted shrubby habit of the whole pl. The fl. are also really fragrant, not disagreeably strong and sickly-scented as in the English pl.

Though growing apparently quite wild, and far away from and above all trace or range of cultivation, the apparent confinement of this pl. to two spots only in Mad. far apart and much resorted to by sportsmen (who in former years, being often Scotch, might possibly have introduced so national a pl. into these two localities, their favourite haunts in search of game) throws some uncertainty on the propriety of regarding it as a truly indigenous sp. And the suspicion is sustained, not only by the fact of its non-discovery in the Canaries or Açores, but by the entire ignorance of the country-people in Mad. of its existence in the island, and by their want of any common name for so (to them) remarkable a tree. Moreover, if it really were a native pl., or even one of more than comparatively recent introduction, its apparent restriction to two remote confined localities would seem more strange, considering the abundance of Blackbirds (*Turdus Merula* L.) in such districts, and the greediness with which in England they devour the fr. and so disseminate the pl.

All this however is pure conjecture or suspicion only: and on the other hand, besides its exhibiting very appreciable varietal differences from the Scotch or English pl., there stand the two significant facts—that it does not occur anywhere in gardens or as otherwise cult. in Mad., and that the closely allied *Pyrus Aria* (L.) Ehrh. or Sm. has been discovered by Webb in Tenerife under very similar circumstances, viz. growing "almost only in two spots very remote from each other" (WB. Hist. iii. i. p. 22).

Nothing either way can be inferred from the fact of its having

escaped in Mad. the search of Masson and all other botanists; for, though apprised of its existence "in the neighbourhood of the Ice-house" by an old sportsman in 1826, it is so difficult to find, growing in detached solitary bushes not rising higher than the dense thickets of *Vaccinium* in which they lurk and are completely buried, that it eluded my repeated search till Sept. 1838, when the ripe fr., making it a little more conspicuous, first betrayed it.

On the whole, and considering the possibility of its having merely eluded observation hitherto in other localities also, I am drawn to the conclusion that this form or var. of Mountain Ash is really indigenous, and not a mere recent modification of the introduced British or European pl.

3. Cydonia (Pers.) Lindl.

††1. C. vulgaris Pers. **Quince.** *Marmelêiro.*

L. ovate or oval, obtuse at the base, abruptly acute, quite entire, tomentose beneath; fl. solitary subsessile; cal. and globosely pearshaped fr. tomentose.—Pers. Ench. ii. 40; DC. ii. 638. *Pyrus Cydonia* Linn., Desf. i. 397; Brot. ii. 330.

γ. *oblonga* Mill., DC. l. c.; l. oval or oblong; fr. subglobose.—Shr. or low tr. per. Mad. reg. 2, $\frac{r}{g}$. In gardens cult. here and there, and quite naturalized in abundance on open hill-sides about S. Antonio near Funchal, particularly across the valley to the S.W. of the Church. Fl. April, May; fr. Sept.—Mostly a low bush 3–8 ft. high, with numerous slender tough flexible twig-like branches much used for riding-switches, smooth and shining downwards, tomentose towards the ends. L. on short footstalks, quite entire, very soft when young and tomentose; afterwards somewhat hard or stiff and naked or smooth above. Fl. large white, more or less rose or blush. Sep. glandular-serrulate. Fr. irregularly globose or short and thick, more or less knobbed, of a uniform golden-y., austere hard and uneatable with a slight garlic taste, but very fragrant, and making a delicious marmalade, which is in particular request amongst the Portuguese, especially as a remedy in colds and sorethroats.

Order XXIX. GRANATACEÆ.

Fl. perfect regular. Cal. coriaceous, tube turbinate adherent to ov., lobes 5–7, valvate. Pet. 5–7. Style 1, stigma capitate. Stam. indefinite free. Fr. (a *balaust*) coated by the cal.-tube and crowned by its lobes, indehiscent or bursting irregularly, internally cellular, divided by a horizontal diaphragm into two unequal stories, the upper 5–9-celled, lower 3-celled, the divi-

sions membranous. Seeds numerous distinct, each coated with a crystalline-pellucid pulp. Albumen 0. Cot. leafy, convolute spirally.—Small somewhat thorny tr. or shr. Young shoots 4-angular. L. simple, mostly opposite on the young shoots, fasciculate or clustered on the old, not dotted, without stip. Fl. axillary towards the ends of the branches.—The Order contains only a single genus.

††1. PUNICA. Character that of the Order.

1. PUNICA L.

Pomegranate. *Romêira.*

††1. P. GRANATUM L.

Subarboreous; l. lanceolate or oblong-lanceolate.—DC. iii. 3.

a. rubra DC. l. c.; fl. deep scarlet; seed-pulp bright garnet- or ruby-red.—*P. Granatum* Desf. i. 392; Brot. ii. 247; BM. 1832 A. and B.; Koch 264.—Shr. Mad. reg. 1, and lower part of 2, c. Hedges by roads in the neighbourhood of Funchal principally to the westward, as on the road to S. Antonio by the hill of S. João, and just before coming to the Church of S. Martinho, &c., perfectly naturalized. In gardens it becomes more of a tr. Fl. Sum.; fr. Aut.—More of a shr. than tr. except in gardens, 10–15 ft. high, with straight erect cinnamon-coloured squarish younger branches often spinescent or ending in a long sharp bare point. Young shoots and l. reddish or flame-col. L. shortly stalked opposite or alternate, often fascicled, shining bright green, perfectly smooth like the whole pl., 1–2 in. long, ½–¾ broad, somewhat stiff and coriaceous, not entirely deciduous in Mad. Fl. very handsome with their bright-scarlet shining cal. and crumpled pet., nearly sessile or very shortly stalked, 1–3 together in the upper axils. Fr. obovate-globose, uniform y., the size of a pear or apple, with a hard leathery coat, contracted at top into a short neck crowned by the large spreading stiff thick starlike sep. The fr. (*Romãa* in Portuguese) has little to recommend it but its beauty. The eatable part or juicy pulp surrounding the seeds is acid but insipid, with only a slight flavour of Red Currants (*Ribes rubrum* L.).

The dwarf narrow-leaved Pomegranate (*P. nana* L., DC.), with single fr.-bearing or double fl., is also often seen in gardens. The fr. of the single-fld. pl. is as large as, or sometimes larger than, that of *P. Granatum* L., of which it is perhaps a mere var.

END OF PART II.

A MANUAL FLORA

OF

MADEIRA.

PART III.

Order XXX. MYRTACEÆ.

The Myrtle Family.

Fl. perfect regular. Cal.-tube adnate to the ovary 4–6-lobed mostly 5-lobed, the lobes valvate in bud, sometimes cohering and falling off like a cap or *calyptra*. Pet. as many as and alternate with sep. quincuncially imbricate or convolute. Stam. numerous or twice as many as pet., free or partially combined; anthers simple ovate, cells bursting longitudinally. Carpels 4–6 mostly 5 concrete coated by the cal. Style 1. Fr. various. Seeds without albumen; cot. *fleshy not convolute*.—Tr. or shr. L. mostly opposite entire *with a marginal nerve, without stipules*, pellucid- or glandular-*dotted* (except in *Psidium*, *Eucalyptus*, &c.), mostly aromatic. Fl. mostly white or purple.

Tribe I. *MYRTEÆ*.

The Myrtle Tribe.

Sep. and pet. 4–5. Stam. free. Fr. berry- or drupe-like.

†††1. Psidium. Cal.-tube globose or turbinate, the limb or rim broad *undivided in bud*, afterwards *irregularly split* 2–5-fid. Pet. 5. Stam. many inserted on nearly the whole breadth of the cal.-limb in *a broad ring*. Ovary 5–20-celled, cells imperfectly or partially 2-partite by a double-edged placenta. Fr. a pome-like fleshy or pulpy many-seeded berry coated by the cal.-tube and crowned by its limb, the cells and partitions more or less obliterated. Seeds rather small imbedded somewhat irregularly in the pulp with a very hard bony shell; radicle longer than the *very small* cot.—Chiefly S. American tropical tr. or shr. L. opposite *not dotted*. Ped. axillary 1–3–5-fl. Fl. white. Fr. sapid eatable pulpy within, with a fleshy pungent-aromatic rind (cal.-tube).

2. MYRTUS. Cal.-tube subglobose, limb *equally and regularly* 5–4-partite. Pet. 5–4. Stam. few or many free inserted at the base of the cal.-limb in *a narrow ring*. Fr. a 2–3-celled subglobose (dry) berry crowned by the persistent cal.-limb. Seeds small several (rarely 1) in each cell with a somewhat bony shell and the radicle twice as long as the *very short* semicylindric cot.—Shr. or small tr. L. opposite pellucid-dotted. Ped. axillary 1-fl. Fl. white.

†††3. JAMBOSA. Cal.-tube globose or turbinate, limb *equally and regularly* 4-fid, lobes rounded. Pet. 4. Stam. very numerous *long* stiff. Ovary with several cells and many ovules. Fr. pome-like umbilicate at top and crowned by the cal.-limb 1–3- or 4-seeded; flesh or rind *thin grumose*, pulp none. Seeds *large* subglobose or (by compression) angular, with a thin horny shell and *very large* fleshy or horny thick cot. welded or locking partially together and concealing the radicle.—Tr. of tropical E. Indian origin. L. opposite pellucid-dotted coriaceous. Fl. white with long tassel-like filaments, in lateral and terminal cymes. Fleshy coat of fr. eatable.

†††1. PSIDIUM L.

†††1. P. PYRIFERUM L. **Guava (Common or White).** *Goiaba*; the tr. *Goiabeira*.

Arboreous, trunk short oblique smooth torose, *branches short stout* crooked, the young shoots square straight stiff thickish; l. *broadly oval*-oblong, *scarcely twice as long as broad, somewhat obtuse or truncate at each end*, rugose and ribbed or lineate with prominent parallel nerves, hard and stiff, pubescent beneath; ped. 1–3- *mostly* 1-*fl. very short*; fr. mostly globose or globosely oval, rarely obovate or turbinate or shortly pyriform, flesh *soft sweet and melting*.—Linn.! Sp. Pl. (ed. 2) 672; Lour. Fl. Coch. i. 309 (descr. opt.); Lam. Enc. iii. 16 (*Goyavier commun* ou *blanc*); Lindl. in Bot. Reg. t. 1079 (fr. unusually depressed); DC. iii. 233. *P. fol. lineatis obtusiusculis, ped.* 1-*floris* Hort. Cliff.! (in BH.) 184. *Guajava foliorum angulis* 4-*angulis, fr. oblongo* Trew. Ehret. 12. t. 43 (l. too narrow and pointed, fr. globose and turbinate or shortly pyriform on same branch). *Guajava alba dulcis* Commel. Hort. Med. Amstel. i. 121. t. 63 (*fr. oval-globose* but l. acuminate)? Merian Surin. 19. t. 19 (fr. globose). *Cujavus domestica* Rumph. Amb. i. 140. t. 47 (fig. bad, l. acute and fr. distinctly pear-shaped)? *Pela* Rheed. Mal. iii. 31. t. 34 (fr. obovate or turbinate, l. obtuse); *Malacca Pela* ib. 33. t. 35 (fr. globose, l. obtuse). *Malo punicæ affinis pomifera*, &c., Sloane! Hist. Jam. ii. 161; *fr. majore albo*, &c., ib. 163; ejusd. Herb. in BH. vol. 7. p. 87; 55. p. 48; 88. p. 19;

100. p. 121 (upper spec.); 235. p. 36; 258. p. 29; 297. p. 57; 315. p. 81.—Tr. cult. Mad. reg. 1, ccc. Gardens everywhere below 1000 ft. and occasionally a straggler from them in waste rocky ground in the neighbourhood of Funchal. Fl. June, July; fr. Nov.–March.—A stout low stiff or stunted-looking tr. 10–20 ft. high, with a thick short oblique or crooked torose remarkably smooth pale fawn-coloured or reddish st. and sturdy crooked short stout stiff irregular mostly upright or at least not loosely declining branches. Bark very smooth and fine pale reddish-cinnamon, deciduous like that of the Plane (*Platanus*). L. stiff but not coriaceous, very shortly stalked, 4 or 5 in. long, 2–2½ broad, at first subacute but soon becoming obtuse or truncate at each end, rugose with strong equidistant regular straight parallel side-ribs, rather dull dark gr. above, pale and like the petioles and ped. finely and shortly downy or velvety more or less beneath. Ped. axillary solitary very short, rarely more than 1-fl. Fl. w. like those of common Myrtle but stiffer and larger. Fr. 1½–2½ in. in diam., mostly globose or globosely ovoid, very rarely turbinate or shortly and thickly pyriform like a Bergamot pear, and though sometimes a little flattish at the poles, I have never seen it depressedly spherical as in Bot. Reg. t. 1079; it is flatly umbilicate at top and crowned with some at least of the somewhat enlarged persistent sep. and covered like an apple with a very thin smooth inseparable skin of a uniform bright golden-y.; within it is more or less deep fleshy-pink or salmon-colour, sometimes quite pale, of a soft melting fleshy rather than pulpy consistence and with a peculiar foxy smell but agreeable fresh sweetish taste, not however at first relished by most people. Seeds numerous flattened subreniform or roundish-obovate very hard and bony pale straw-colour slightly mucilaginous.—The fr. makes excellent Guava-jelly, but the process requires considerable care and nicety, the syrup in boiling passing very rapidly from a too liquid into a too stiff or tough consistence.

The Linnæan names of this and the following sp. are unfortunate, leading to the notion of a pear-like shape being the ordinary or distinctive instead of a merely rare and casual form of the fr. in the common garden Guava. Thus I have myself unjustly criticised Holl for referring the "apple-shaped" Mad. Guava of his List (J. of Bot. i. 21, 41) to "*P. pyriferum* L."

†††2. P. POMIFERUM L. **Red or Wild Guava.**

Shr. or subarborescent, with straight subelongate or slender *loose drooping or declining branches*, the younger square and finely downy or velvety-pubescent; l. *distichous elliptic*-oblong or lanceolate-oblong *acute or pointed at each end, more than*

twice as long as broad, ribbed or lineate, hard and stiff, pubescent beneath; ped. 1–3- *often* 3-*fl. moderately long*; fr. globose *somewhat hard and austere,* flesh *firm and dryish.*—Linn.! Sp. Pl. (ed. 2) 672; Lour. Fl. Coch. i. 310; DC. iii. 234. *Goyavier sauvage* (vulg. *G. rouge, G. des Savannes*) Lam. Enc. iii. 17. *Guajava alba acida fr. rotundiore* Pluken.! Almag. 181. t. 193. f. 4. *Cujavus agrestis* Rumph. Amb. i. 142. t. 48. Merian Surin. 57. t. 57. *Guajava rubra acida Hort. Lugd.* Sloane! Herb. in BH. vol. 7. p. 87 (on a loose sheet); ejusd. (Gardens, Holland) 79. p. 100; 86. p. 85 (ped. 1-fl., fr. immat. subpyriform!); 91. p. 93; 162. p. 239; 206. p. 4; 235. p. 36.—Shr. cult. Mad. reg. 1, rr. Occasionally in gardens about Funchal, raised, as at the Achada by the late Mrs. Penfold and by myself, from W. Indian seeds. Fl. June; fr. Jan.—Rather a large spreading shr. than tr., without a decided trunk though 10–15 ft. high, with longer weaker easy-flowing drooping or declining branches and more regularly distichous and close-set narrower always somewhat pointed l. than *P. pyriferum* L. Young shoots, l. beneath, petioles and pedicels minutely more or less velvety. L. shortly but distinctly stalked 3 or 4 in. long, 1–1½ in. wide, their petioles ¼ in. long, somewhat abruptly acute, yet with the very point or tip itself blunt or sphacelate. Ped. ½ in. or more long, in Mad. mostly 1-fl. Fr. always globose small hard, not more than 1 in. in diam., crowned with the much enlarged sep., pale lemon-y. or even green when ripe or at least when quite deep red inside, with the flesh somewhat hard dry and austere and of a deeper red or flesh-col. than is usual in *P. pyriferum,* and though stronger tasted, very inferior in quality, having much the same relation to it as the Crab (*Pyrus acerba* DC.) has to the Garden Apple (*P. Malus* L.). I have indeed sometimes doubted whether the two sp. should not be united, as by Raddi, into one (*P. Guiava* Radd.); but the seedlings of both retain their proper characters.

The Araça (*P. littorale* Raddi) with small yellowish-gr. pear-shaped fr., and the Cattley Guava (*P. Cattleianum* Sab. BM. t. 2501) with small globose dark crimson or blood-red fr. tasting like Hautboy Strawberries, are also not uncommon in gardens about Funchal, the latter having been introduced by myself in 1833 or 1834. The Araça is a tall tr.; the Cattley Guava a mere bushy shrub. Both have the branches round, with shining coriaceous l. of which the younger are cinnamon-red or reddish in the Cattley Guava, the early bearing of which, added to the profusion and excellence of the fr., renders it a valuable acquisition. Seedling pl. begin to bear in their 3rd

or 4th year whilst quite small, producing afterwards an abundant and never-failing sometimes double crop.

2. MYRTUS L.

Myrtle.

1. M. COMMUNIS L. *Murta.*

Very smooth; l. ovate or lanceolate acute coriaceous shining; ped. solitary 1-flowered about as long as the l. with a pair of deciduous linear bractlets at the base of the fl.; cal. 5-fid; pet. 5; stam. many.—DC. iii. 239; Desf. i. 391; Koch 276.

a. latifolia (Common or Broad-leaved Myrtle); l. 1–2 in. long, the upper lanceolate opposite, lower ovate subalternate, all distinct or subremote and acuminate; ped. long filiform.

Subv. 1; ped. not longer than l.; berries black globose.—*M. communis* ϵ. *lusitanica* L.!; DC. l. c. *M. communis* Buch! 197. no. 373; Brot. ii. 246; Fl. Gr. t. 475.—Shr. or small tr. Mad. reg. 2, 1 (upper part), $\frac{c}{2}$. Dry sunny rocks and slopes, chiefly on the sides of ravines. Banks of the Curral dos Romeiros, of the Serra d'Agua and of the Cayados Ravine beyond Camacha, forming in some parts thickets with Heath and Laurels. Two or three miles up the Machico Valley abundant, and becoming tr., several of which stand by the roadside about a mile above S. Christovo. Several fine and very old tr. also grow on the edge of the seacliffs (about 900 ft. high) at a place called Larano, E. of Porto da Cruz. March–Oct., but at most seasons.—Generally a low bush 3–6 ft. high, but occasionally a tr. with a straight gnarled and knobby st. as thick as a man's thigh or more (5–10 in. diam.) with a rough greyish here and there cinnamon-reddish bark and bushy head, 20–25 ft. high. Foliage evergreen of a dark bright shining gr., the young l. and shoots reddish. Smaller branches cinnamon-brown straight slender but stiff erect virgate. L. when bruised finely aromatic, the lower ovate twice, the upper lanceolate $2\frac{1}{2}$–3 times, as long as broad. Ped. filiform, about $\frac{2}{3}$ the length of l., solitary but often, before its fr. is ripe, a 2nd fl., with shorter ped., is developed from the same axil. Pet. white inside, reddish or crimson outside especially in bud, concave reflexed. Sep. broadly half-ovate large short persistent, at first obtuse, afterwards acute, in fr. erect or spreading. Berries black globose about 3 lines diam. flatly umbilicate at top, dry and uneatable. Seeds 3–6 rather large flattened subreniform hard pale yellowish shining.

The use of the young leafy shoots and twigs for strewing the streets of Funchal at processions has doubtless caused its dis-

appearance from many places in that neighbourhood where former botanists and travellers have described it as forming thickets. In some places (Serra d'Agoa, &c.) the young shoots and l. are also used for tanning leather.

The subv. (*M. communis α. romana* L.!) with long slender ped. considerably longer than the l., does not occur in Mad.

The dotted surface of the fossil leaf, figured by Prof. Heer, under the name of *Pistacia Phæacum* p. 32. t. ii. f. 25, forbids entirely its reference to *Pistacia*, or indeed to any pl. of the Order *Terebinthaceæ* (see p. 113 *supra*), and establishes a better claim for its reference to *Myrtus communis α. latifolia* Subv. l. than remains in the impressions ff. 21, 22 of the same plate referred by Prof. Heer unhesitatingly to the last-named pl.

†††β. *parvifolia* (Narrow- or Small-leaved Myrtle); l. not above ½ in. long ovate crowded; ped. much shorter than the l.

The common Garden and Cockscomb Subvarieties of this, distinguished at once from *α.* by the small crowded l. scarcely ½ in. long and shortly stalked fl., called by the Portuguese "Murta da India," occur frequently in gardens: the former (*M. communis β. tarentina* L., DC.) rising sometimes into a tr. 20 ft. high with a trunk 4–9 in. in diam. or 1–3 ft. in circumf.; the latter (*M. communis ζ. belgica* L., DC.), a mere shr., known by its monstrously flattened or dilated terminal shoots.

The "Pitanga," *Eugenia brasiliana* (L.), (*E. Michelii* Lam., DC.; *Myrtus Brasiliana* L., *Plinia rubra* L., and *P. pedunculata* L. fil. BM. t. 473) with its Myrtle-like habit and fl., and elegant pendulous scarlet fr. the size of a large cherry depressed and ribbed like a melon, with a fine acidulous but resinous (turpentine) flavour, containing 1 or rarely 2 large flat pale or whitish seeds, is also very common in gardens about Funchal, bearing profusely almost all the year round.

††† 3. JAMBOSA Rumph., DC.

†††1. J. VULGARIS DC. **Rose-apple.** *Jambociro.*

Panicle cymose terminal; l. narrow-lanceolate acuminate at each end.—DC. iii. 286; BM. t. 3356. *Eugenia Jambos* L.; BM. t. 1696.—Tr. Mad. reg. 1, 2 (lower part), cc. In gardens chiefly about Funchal and seminaturalized here and there by roadsides, or in waste grounds and hedges. Fl. March–May; fr. Aug., Sept.—A fine tr. 20–40 or 50 ft. high, with thick rich dark-gr. shining evergreen foliage enlivened in May and June

by the bright cinnamon-red of its young l. and shoots. L. coriaceous evergreen 6–8 in. long, 1–1½ wide. Fl. large in thick trichotomous tassel-like bunches at the ends of the branches, greenish-white at first, then cream-col. scentless. Fr. very beautiful, pale buff or apricot-y. mostly tinged with rose or purple on one side, with a strong scent and taste of rose-water, about the size of a walnut globose more or less turbinate, the flesh not above 2 or 3 lines thick and of a somewhat spongy dry or grumose substance, sweet but vapid and soon palling on the palate, resembling a sweet dry spongy apple steeped in rose-water. The large hollow space inside is not quite filled by a large round single, or by 2 or 3 partly round partly angular brown seeds with very large thick gr. cot. closely welded together.

The fr. is scarcely ever admitted to the table, but is left to be eaten by children or devoured by swine.

J. Malaccensis (L.) BM. 4408 with its fine large stiff coriaceous Magnolia-like l. nearly a foot long and 4 in. broad, resembling strongly those of *Pleiomeris* or *Myrsine canariensis* (Willd.) and crimson fl. and fr. (the latter pear-shaped or rather clavate) produced on the old wood or branches below the l., also occurs in a few gardens about Funchal.

Order XXXI. ONAGRACEÆ.

Fl. perfect mostly regular. Cal. tubular wholly or partly adnate to the ovary, 2–5-lobed, lobes mostly 4 valvate in the bud. Pet. as many as cal.-lobes, rarely 0, inserted at top of cal.-tube, alternate with its lobes, twisted in bud. Stam. twice or half as many as pet. and inserted with them. Ov. 4- or 2-celled with a central placenta. Style 1 filiform, stigma capitate or lobed. Fr. a berry or capsule with mostly 4 cells. Seeds without albumen small and mostly numerous.—L. simple opposite or alternate sometimes whorled, without dots.

††Tribe I. *FUCHSIEÆ*.

The Fuchsia Tribe.

Fruit a berry.—S. American shr. or tr. L. opposite or whorled. Fl. crimson or rarely white, scentless.

††1. FUCHSIA. Cal. combined with the ovary below, free above and produced into a 4-lobed coloured tube, constricted and falling off together with the cor. at its junction with the ovary. Pet. 4 convolutely imbricate forming a short cup, rarely 0. Stam. 8. Ov. crowned with an urceolate disk. Style filiform, stigma capitate. Berry 4-celled

many-seeded. Ovules in 2 rows in each cell.—Pedic. axillary or racemose; fl. drooping, sometimes 5-fid, with 10 stamens.

Tribe II. *ONAGREÆ.*

The Willow-herb or Evening-primrose Tribe.

Fruit a capsule; cells many-seeded.—Flaccid quickly withering herbs, with rose, flesh-col. or nearly white, and y. fl. Cal.-lobes soon falling.

2. EPILOBIUM. Cal. 4-cleft shortly funnel-shaped above the ovary, deciduous. Pet. 4 bilobed or notched. Stam. 8. Style filiform. Stigma 4-cleft and cruciform or clavate. Caps. linear 4-celled 4-valved. Seeds bearded.—Fl. rose or flesh-col. scentless. Mostly subaquatic herbs.

††3. ŒNOTHERA. Like *Epilobium*, but cal. tubular above the ovary, caps. oblong-linear (thicker and shorter) and seeds not bearded.—Fl. mostly y., rarely purple or white, often fragrant; pet. flaccid, of short duration soon withering. Not specially aquatic herbs.

Tribe I. *Fuchsieæ.*

The Fuchsia Tribe.

1. FUCHSIA L.

††1. F. COCCINEA Ait. **Fuchsia (the old sort).** *Mimos.*

Branches smooth; young shoots with the petioles and midribs of l. beneath slightly hairy; l. opposite or in threes ovate or lanceolate acuminate rather remotely denticulate with red veins and midrib, very shortly stalked; pedic. axillary smooth filiform longer than the drooping fl.; cal.-lobes lanceolate acuminate twice the length of the pet. which are closely convolute into a short tube; cal.-tube cylindric constricted both at top and bottom, much shorter than its lobes; stam. and style long exserted; stigma simple oblong-clavate.—Ait. Hort. Kew. ii. 8; BM. t. 97; DC. iii. 38. *F. Magellanica* Lam. ex. DC.—Shr. per. Mad. reg. 1, 2, ccc. Forming hedges and on walls and in waste ground about cottages and gardens, completely naturalized, everywhere. Throughout the year.—A low bushy shr. 3 or 4 ft. high with dark lurid often purple-reddish foliage, perpetually enlivened by its numerous peculiarly elegant pendulous bright cr. fl., or rather by their corolla-like deep-cr. cal.; the pet. forming a dark violet tube-like cup inside, not visible on the bush regarded generally. Fr. shortly oblong black with

a claret-col. juice, sweet but insipid, quite harmless, a favourite food of turkeys, and eaten sometimes by children.

F. gracilis Lindl. (*F. decussata* Sims BM. t. 2507, not Ruiz et Pav.), *globosa* Lindl. (BM. t. 3364), *fulgens* DC. (BM. t. 3801), *corymbiflora* Ruiz et Pav. (BM. t. 4000), &c. and *Schufia arborescens* (Sims) BM. t. 2620 are common in gardens; but, though introd. 20–30 years ago, have shown as yet no tendency to become naturalized.

Tribe II. *Onagreæ*.

The Willow-herb or Evening-primrose tribe.

2. Epilobium L.

Willow-herb.

§ *Lysimachion* Tausch. DC.; fl. regular; cal. with a short free tube above the ovary, pet. 2-lobed or obcordate, stam. and style erect. L. opposite, the upper alternate.

(*a*) Stigmas free spreading. Stem rounded. Stolons none; rosettes autumnal sessile.

1. E. parviflorum Schreb.

Softly pubescent; st. round erect *villous-downy with short spreading cottony pubescence*; *l. sessile lanceolate from a rounded base*, rather closely and sharply denticulate or serrulate, the lowest shortly stalked; *rac. erect*; fl.-buds ovoid mamillate, sep. lanceolate simply acute; seeds minutely granulate *obovate-oblong* truncate at top, blunt or *rounded* at the base.—EB. t. 795; Hook. Fl. Sc. i. 117; Sm. E. Fl. ii. 214; DC. iii. 43; WB.! ii. 7; Koch 265 (var. *α*); Bab. 117. *E. molle* Lam. Enc. ii. 475; Spr. ii. 232. *E. palustre* Willd. (not Linn.). *E. villosum* Curt. *E. hirsutum* *β*. L. *E. pubescens* Brot. ii. 19.—Herb. per. Mad. reg. 1, 2, 3 (chiefly 2), c. Moist banks and rocks; Rib. de S^{ta} Luzia, Rib. da Metade, Serra d'Agoa, &c.; scarcely below 2000 ft. except on wet seacliffs, as on the road between P^{ta} do Sol and Magdalena, S. Vicente and Seixal, S. Vicente and P^{ta} Delgada especially at the Passo d'Aréa where it is very abundant. June–Aug.—St. stout firm and stiff, mostly red or purplish, 12–18 in. high, perfectly round without lines or angles, leafy throughout and mostly simple or a little branched at top only, mostly erect altogether, but sometimes decumbent though never rooting at the base, thickly clothed with crisped entangled spreading cottony pubescence. Whole pl. of a dull somewhat greyish or hoary gr. Stolons none. L. sessile but neither decurrent nor amplexicaul, truly lanceolate being rounded but not broadest at the base, softly and closely downy all over. Fl.

inconspicuous small pale rose or flesh-col., mostly rather smaller than in Brit. or Canar. ex., but sometimes as large or with pet. reaching 1½–2 lines beyond tips of sep. Stigmas even in the bud distinctly 4, in the open fl. spreading. Caps. subpubescent 2 in. long, with the valves strongly recurved when ripe.

E. montanum b. *pubescens* Raddi Obs. in Antol. ii. (Florence 1821) was most probably the present pl., the true *E. montanum* L. not having occurred in Mad. to any other botanist, and Raddi's List of Mad. sp. being most incorrect in its nomenclature throughout.

2. E. LANCEOLATUM Sebast. et Maur.

Finely pubescent but *appearing nearly or quite smooth*; st. slender erect simple or branched only upwards, round or very obscurely angular, *minutely pubescent*; l. *distinctly stalked* shining oblong-lanceolate *wedge-shaped or narrowed at the base into the footstalk*, entire downwards, sharply and distinctly but subremotely or irregularly toothed or serrulate upwards; *top of rac. drooping in the bud*; fl.-buds ovoid mamillate; sep. lanceolate simply acute; seeds minutely granulate obovate-oblong *subacute at base.*—Sebast. et Maur. "Fl. Rom. Prodr. 138. t. 1. f. 2;" Koch 1022; EBS. t. 2935; Bab. (ed. 4) 117. *E. montanum* Lemann ! Herb. Mad. (not Linn.).—Herb. per. Mad. reg. 2, rrr. "Curral das Freiras, Dec.," Dr. C. Lemann.—A slender delicate pl. 10 or 12 in. high, smooth to the naked eye, with small remote narrow l. St. slender finely pubescent erect. L. appearing to the naked eye quite smooth, very shortly though distinctly stalked, narrow-lanceolate and narrowing gradually into the short footstalk at their base, sharply and distinctly though remotely serrulate upwards. Buds and fl. none in spec. Caps. (nearly ripe in spec.) 2 in. long linear fine and slender. Seed (not quite ripe) finely tuberculate blunt at top, a little pointed at bottom. (From Lemann's single Mad. spec.)

My attention was first drawn to this as a Mad. pl. by a pencil note—"*E. montanum* L. (Curral das Freiras, Dec., Lemann)" —written by the late Dr. Charles Lemann in my MS. Catalogue of Mad. pl. lent to him in August 1848 for the completion of his own list. On referring to his Herbarium at Cambridge through the kind offices of Prof. Babington, I found (and described) the spec. to which he thus referred, named as above in his own handwriting, with the word "*roseum*" in pencil appended by Mr. Bentham to its label. I concur however in Prof. Babington's opinion that it is *E. lanceolatum* Sebast., though in Dec. 1858 I searched in vain for it in the Curral das Freiras, and could find nothing but *E. tetragonum* L. In

hope of helping others in Mad. to a more successful result I subjoin some other details of the sp. chiefly from Mr. Borrer's excellent account and Mr. Salter's beautiful figure of it in EBS. 2935 :—

Stolons none. Rosettes with long spreading bright gr. sulcate l. Whole pl. often reddish. St. obscurely and very bluntly angular chiefly towards the base, clothed with a minute ascending curved pubescence. L. dull gr., smooth to the naked eye and generally more or less shining, yet covered on both sides with microscopic curved ascending hairs. Leafstalks somewhat winged. Fl. small, at first w., then pale rose, their veins colourless. Lobes of stigma short, sometimes closed sometimes separate.

(*b*) Stigmas cohering into a club-shaped mass. St. angular with raised lines.

1. *Stolons none; rosettes autumnal subsessile.*

3. E. TETRAGONUM L.

Smooth or with only the upper parts of the st., the fl.-buds and caps. minutely adpresso-pubescent; st. erect from the base slender leafy 4-angular virgate simple erectly branched and minutely adpresso-puberulous upwards only; l. mostly altogether smooth and shining, sometimes minutely puberulous at the edges and on the midrib, narrow-ligulate or strap-shaped rather than lanceolate, rounded but not broadest at the base, sharply and evenly serrulate throughout; the lower and a few of the upper stalked, the intermediate quite sessile subdecurrent with a rib running from each leafy margin down the st.; rac. erect corymbose; fl.-buds ovate-oblong; sep. lanceolate acuminate; cal. and caps. like the upper parts of st. adpresso-puberulous, the latter long and slender; seeds minutely granulate oval-oblong rounded at the base.—Brot. ii. 17; Hook. Scot. i. 117; Sm. E. Fl. ii. 215; DC. iii. 43 (excl. var. β); Koch 267; Bab. 118; Gren. et Godr. i. 579. *E. obscurum* Holl! (not Schreb.).—Herb. per. Mad. reg. 1, 2, r. Moist banks and rocks in ravines on seacliffs, &c.; Rib. de S^{ta} Luzia at the origin of the Levada de S. Roque above the Mill; seacliffs a mile out of Funchal along the Caniço road by the ladder descending to the beach, and on the road from Ribeira Brava to Ponta do Sol; Curral dos Romeiros halfway down from the Mount to the bridge under high rocks on the left hand; Rib. da Janella on rocks by the roadside ascending from the beach; seacliffs S. Vicente on the road to Seixal. June, July.—Whole pl. nearly smooth and quite distinct in habit and appearance, with its simple stiff straight erect virgate st. branched at top only, long

narrow thickly and evenly serrulate l. and corymbose fl. or fr., from the other Mad. *Epilobia*. St. 6–18 in. high hard firm and slender, round below, angular but not always square upwards, quite straight and mostly entirely erect, but if accidentally from situation a little procumbent yet never rooting at the base. L. 1–4 in. long 2–4 and 5 or even 8 lines wide with subparallel margins and so rather ligulate than lanceolate, the lower obtuse, the upper gradually more acute, the intermediate not wedge-shaped narrowed or entire at the base, but perfectly sessile with their leafy basal margins distinct full or plicate (not auriculate) and narrowly decurrent; the upper l. at the origin of a branch or fl. are often distinctly stalked like all the lower l. In my Mad. ex. the l. are quite smooth, but in some luxuriant Can. spec. from Palma they are minutely puberulous at their edges and on the midrib as sometimes in *E. obscurum* Schreb. Fl. much smaller than in *E. parviflorum*, pale pink or rose. Stigmas cohering into an oblong club. Caps. very long and slender 2–2½ in. long, 2 mill. broad, corymbosely crowded towards the top of the st. and all ripening nearly together; their valves spreading but scarcely curled or rolled back.

Although omitted by Webb and Berthelot, this is also a Canarian sp., found by myself in the great Caldera of Palma, and by Bourgeau in Gomera (Bourg. Pl. Can. no. 747 in BH.).

2. *Stolons æstival prostrate filiform with remote small leaves* (Bab., Grenier).

4. E. OBSCURUM Schreb.

Smooth except st. upwards, buds, caps., edges and midrib of upper l. which are finely adpressedly pubescent: st. ascending procumbent and rooting at the base, much branched and angular but not regularly square upwards, round below; l. rather broadly subovato-lanceolate acuminate narrowing gradually from a rounded broadish base, all quite sessile not decurrent but with two strong ribs running down the st. from their base, faintly and remotely denticulate and except the mostly very minutely puberulous edges and midrib smooth and shining; rac. erect leafy, fl. axillary scattered subremote, buds ovoid-oblong, sep. lanceolate acute; caps. short pubescent with strongly recurved valves, the lower ripening long before the upper; seeds minutely granulate oblong-obovate pointed at the base.—Bab. 118; Holl's List in Hook. J. of Bot. i. 21? *E. tetragonum* β. *obscurum* Pers. Ench. i. 410; DC. iii. 43. *E. virgatum* Koch 266, 1023 (in part); Gren. et Godr. i. 578 (chiefly).—Herb. per. Mad. reg. 3, rr. Moist banks and rocks in ravines; Rib. da Metade along the Levada; Fajaã do Corte in the Curral das Freiras under Pico Ruivo. July–Sept.—At once distinguished

from *E. tetragonum* L. by its broader or shorter more remotely and obscurely toothed l., loosely branched or straggling decumbent or ascending st. and branches often rooting at their lower joints, and short remote scattered not corymbosely crowded caps. The stolons unfortunately I have neglected in Mad. to observe. Pl. mostly robust and leafy, but sometimes weak and slender, much and stragglingly branched upwards or when in fl., 1–2 ft. high. St. compressible or more herbaceous than in *E. tetragonum* L. and less regularly square or sharply angular, the leafy margins of the l. not decurrent. L. 1½–3 in. long, 5–8 lines wide, rounded and distinctly broader at or near the base than elsewhere and equably attenuate therefrom into a fine drawn-out point, neither ligulate with parallel, nor lanceolate with curved margins widening above the base or in the middle, as in *E. tetragonum* L. Fl. as small as or smaller than in *E. tetragonum* L. pale rose subremote axillary along the branches or scattered in long erect leafy rac. Caps. 1–1½ in. long, 2 mill. broad, ripening in succession all along the branches and not corymbosely crowded upwards, the lower ripening and shedding their seeds long before the upper.

"*E. obscurum* Schreb." of Holl's List may possibly have been the true pl. But a spec. from him gathered in June 1827 was certainly *E. tetragonum* L. And hence my remark in Hook. J. of Bot. i. 41, before I had found the much rarer *E. obscurum* Schreb. in Mad., that by "*E. obscurum* Schreb." I supposed Holl to mean *E. tetragonum* L.

E. obscurum Reich. Ic. Bot. Crit. ii. 89. t. 199. f. 341 with narrow regularly and closely serrulate l. and long slender corymbose caps., is rather true *E. tetragonum* L.

††3. Œnothera L.

Evening-primrose.

§ *Onagra* Ser. in DC.; stigma 4-cleft, fr. linear-oblong 4-angular, valves linear.

††1. Œ. longiflora Jacq.

St. erect simple or sparingly branched and with cal. and caps. pustulate-villous; l. denticulate pubescent; cal.-tube very long; pet. 2-lobed half the length of cal.-tube, longer than the style and stam.; caps. very long swollen in the middle contracted at the top.—BM. t. 365; DC. iii. 47; Holl's List in J. of Bot. i. 21. —Herb. ann. Mad. reg. 2, rrr. On the site of an old garden and Quinta at the Mount, formerly belonging to the late Mr. Murdoch, half a mile W. of the Mount Church, perfectly natura-

lized; and a weed in gardens in the neighbourhood of the same. May, June.—Remarkable for the enormous length (2 in. or more) of the cal.-tube. St. 3 or 4 ft. high stout long simple or with few straggling branches. Foliage small and scanty. L. lanceolate distinctly toothed. Whole pl. especially the st., cal. and caps. villose. Fl. 2½ in. in diam. bright full golden y. turning orange-brown in withering. St. strongly, cal. and caps. less conspicuously pustulate or warted at the base of the hairs.

Œ. suaveolens Desf. (Flor de Manteiga, Port.) distinguished by its simply and finely pubescent st. cal. and caps. here and there sprinkled with a few longer hairs, nearly or quite entire minutely puberulous but smooth-looking l., large fragrant lemony. fl. with pet. (1½ in. long) as long as cal.-tube and twice as long as the style and stamens, and with the sepals cohering more or less and reflexed mostly all together on one side, is sometimes seen in cottage gardens chiefly in the north, and has been for some years almost a weed in the garden of D^{na} Vicencia's Quinta (late of S^{r} Manoel Joaquim da Trinidade) at S. Vicente, without however spreading beyond its walls.

§ *Œnotherium* Ser. in DC.; stigma 4-cleft, fr. obovate-clavate and often 8-ribbed, valves obovate.

††2. Œ. TETRAPTERA Cav.

St. subdiffuse branched and with cal. and caps. villous-hairy; l. lanceolate irregularly sinuate-toothed and often subpinnatifid downwards subsessile hairy-pubescent; cal.-tube very short; pet. obcordate entire, stam. and style shorter than pet., anth. and stigma long and narrow; caps. stalked obovate-clavate 8-ribbed 4-winged villous.—Cav. Icon. iii. 40. t. 279; BM. t. 468; DC. iii. 50.—Herb. per. ? Mad. reg. 1, r. Vineyards and waste ground about Funchal, especially below the Quinta do Valle, perfectly naturalized; also at the Mount, S^{r} Moniz. May–July principally.—A low sparingly branched pl. Branches diffusely spreading 6–12 in. long. Foliage greyish dull gr. Fl. large handsome; pet. an inch long, pure white at first, turning deep rose in withering. Caps. very remarkable in shape, with 4 abrupt prominent wings.

"*Circæa lutetiana* L." of Holl's List in J. of Bot. 1. 21, 41, was doubtless either a mistake for something else (possibly *Achyranthes argentea* L.), or from admixture of Portuguese with Mad. specimens. No such pl. has occurred to any other botanist in Mad., nor has it been found either in the Canaries or Açores.

Order XXXII. LYTHRACEÆ.

Fl. perfect regular. Cal. tubular or bell-shaped free 8–12-lobed, lobes in two rows, the inner valvate in the bud. Pet. half as many as sep. inserted at top of cal.-tube alternate with its inner lobes and quickly falling, sometimes none. Stam. inserted below the pet. within the cal.-tube 4–12 very variable in number. Ovary free 2–4-celled. Caps. membranous free covered by the cal.-tube 1–4- (mostly 1-) celled with a central placenta, many-seeded. Seeds without albumen small. Cot. leafy flat.—Herbs, small shr. or tr. with no peculiar properties. Branches often square. Stip. none. L. simple entire mostly opposite. Fl. axillary or racemose mostly purple, rose-col., or white.

Tribe I. *SALICARIEÆ.*

The Loosestrife Tribe.

Cal.-lobes remote, with or without inner intermediate teeth. Seeds simple.—Small shr. or subaquatic herbs.

1. LYTHRUM. Cal. tubular cylindric with 8–12 teeth, the 4–6 outer broader erect. Pet. 4–6. Stam. equal or double the number of pet. inserted at or below the middle of cal.-tube. Style filiform. Stigma capitate. Caps. oblong 2-celled.

1. LYTHRUM L.

§ *Hyssopifolia* DC.; fl. axillary solitary.

* Stam. about as many as or fewer than the pet. *i. e.* 4–6.

1. L. HYSSOPIFOLIA L.

St. branched chiefly at the base or simple *erect*, branches ascending or decumbent, leafy *flowering almost from the base*; l. alternate crowded sessile *lanceolate-linear attenuate or contracted at each end*; fl. *inconspicuous small much shorter than the l.* subsessile; ped. very short erect in all stages with 2 minute linear-acuminate bractlets at top; cal.-tube *rounded faintly* ribbed smooth; the outer teeth very narrow; pet. 5–6 oblong-obovate half or $\frac{2}{3}$ length of cal.; stam. 4–6 included.—Desf. i. 372; Brot. ii. 244; DC. iii. 81; WB. ii. 5; Seub. Fl. Azor. 47. no. 354; Koch 274; Bab. 115. *L. hyssopifolium* EB. t. 292; Sm. E. Fl. ii. 344.

β. *acutifolium* DC. l. c. 82; l. rather acute.—*L. thymifolium* Hoffm. ex. DC. (not Linn.).—Herb. ann. Mad. reg. 2, r.; ND. reg. 1, r. In damp shady spots. Near the head of the Levada which conducts water out of the Rib. de S^{ta} Luzia to the Quinta of the late Webster Gordon Esq. at the Mount; N. side of the

Church of S. Jorge and descending from the Ilha into the Rib. de S. Jorge; plentifully in cornfields &c. all the way up the valley above Seixal called the Chaõ da Ribeira; about the Church and Pilgrims' House at S. Antonio da Serra; also in great luxuriance and abundance round the edges of a pool in the middle of the ND. about 100 yds. W. of the ruined house. May–Aug.—Wholly smooth. St. quadrangular branching from the base, sparingly branched or simple upwards, 9–18 in. long; main st. erect, the branches lying partly flat the ends ascending, reddish on the upper side, flexible or weak and flaccid but peculiarly tough, and almost woody at the base. L. rather dull gr. thickly crowded upwards and fastigiate at the ends of the shoots, irregularly alternate, 6–9 lines long, 1–2 broad, more or less lanceolate, attenuate downwards to the base, more so upwards, all quite entire and more or less acute. Fl. all up the branches from their very base, very small and insignificant pale pink or flesh-col., one from each axil, scarcely more than 2 lines long together with the very short round ped., or about $\frac{1}{3}$ length of l. Cal. 3 millim. or $1\frac{1}{2}$ line long, tube slender 1 millim. broad at top, rounded not angular or so strongly ribbed as in *L. Græfferi* Ten., pale gr.; the 5 or 6 outer teeth opake herbaceous dark-gr. red or purple at the tip narrow linear-lanceolate spreading; the alternate inner teeth much shorter broadly ovate membranous erect. Pair of bractlets at base of cal.-tube scarcely 1 millim. long, membranous very narrow and minute. Pet. obovate 1 line long, half as broad. Stam. and style not exserted beyond the cal.-tube, the pale whitish anthers being only just visible within its throat. Stam. 4–6 inserted opposite the shorter broad membranous erect inner cal.-teeth, their fil. nearly equal. Style 1 line long straight round smooth; stigma capitate. Ov. a little compressed smooth the length of the style, 2-celled; cells with many ovules. Caps. as long as or just longer than the cal.-tube.

Brotero's description applies exceedingly well to the present pl. DC. however mentions, l. c. p. 82, that his syn. is referred by Link to *L. meonanthum* Link—a pl. which I am unable to trace out. Steudel also refers Brotero's syn. to Link's pl.

** Stam. twice as many as pet. *i. e.* about 12.

2. L. Græfferi Ten.

St. *prostrate or procumbent rooting at the base, ultimately elongated trailing* naked and suffrutescent downwards, *flowering only upwards*; l. alternate crowded sessile or subsessile *ligulate* or linear, *rounded or subcordate at the base*; *fl. conspicuous nearly as long as the l.*; ped. very short erect in all stages, with a pair of minute linear-acuminate bractlets at top; cal.-tube *angular*

strongly ribbed smooth, the outer teeth half-ovate or lanceolate; pet. 6 obovate the length of the whole cal.; *stam.* 12, 6 very short, 6 longer more or less exserted.—Ten. Fl. Nap. iv. 255. t. 142; DC. iii. 82; WB. ii. 6; Seub. Fl. Azor. 47. no. 353. *L. junceum* Buch ! 197. no. 372; Sol. MSS. ! Prim. 32. *L. flexuosum* Holl ! in J. of Bot. i. 21, 41.—Herb. ann. Mad. reg. 1, 2, 3, ccc; PS. reg. 2, rr. In watery springy places on seacliffs, in beds of ravines, about springs and in hollows amongst hills and mountains in Mad. everywhere; in PS. only at the Fonte das Pombas and in beds of streamlets beyond Camaxa. May–Oct. —An altogether larger pl. than *L. Hyssopifolia* L., with stouter longer often greatly elongated trailing st., broader l. and larger handsome fl. St. sharply 4-angular scarcely branched except at the base, 1–4 ft. long slender weak and trailing far amongst the surrounding bushes or herbage, purplish and thickly leafy upwards, light brown naked and woody downwards, flexible throughout. Whole pl. quite smooth. L. dull rather than glaucous gr. varying much in breadth but always broadest close to or at the base and thence very gradually contracting upwards so as to be rather ligulate than lanceolate, 6–9 or 10 lines long, 1–3 broad, the lower broader and subobtuse, the upper narrower acute, all quite entire. Fl. crowded towards the leafy ends of the branches, conspicuous, bright rose-purple, 4–5 or 6 lines long or more than twice the size of those of *L. Hyssopifolia* L., with the outer teeth of cal. mostly broader and shorter. Pet. distinctly clawed 3–3½ lines long, 1–1½ broad, erose and crumpled at the edges. Stam. always 12, 6 long more or less exserted, 6 short included, the shorter opposite the broad inner membranous cal.-teeth: hence it is the 6 longer which are wanting in the preceding sp. Anthers bright chrome-y. Caps. shorter than the cal.-tube. Seeds often abortive.

Apt to vary considerably in most of the above characters, often becoming, late in the summer or aut., almost shrubby with very long woody branches and smaller fl., which have narrower outer cal.-teeth and the style and longer stam. almost included or only just apparent in their throat. It is an elegant pl., adorning with its bright rose fl. moist and plashy places in the mountains everywhere.

L. acutangulum Lag. Gen. et Sp. 16. no. 211 is probably this sp., but his *L. flexuosum* no. 210 seems distinct.

†††Order XXXIII. CUCURBITACEÆ.

The Gourd or Pumpkin Family.

Fl. regular often imperfect unisexual, 1–2-œcious. Cal.-tube adnate with the ovary 5-lobed, lobes or sep. imbricate in bud. Cor. 5-cleft, or with 5 pet. more or less united together and with the cal. at the base, rarely distinct, reticulately veined, valvate in the bud. Stam. 3–5, more or less combined or cohering, rarely free. Anthers mostly sinuous. Style short; stigmas 3–5, 2-lobed. Ov. inferior 3–5-celled many-seeded, or 1-celled 1-seeded; placentas pseudoparietal. Fr. a more or less fleshy or juicy gourd (*pepo*), berry or drupe. Seeds ovate or oval mostly compressed arillate; cot. leafy; embryo straight flat at or near the upper end of the seed; albumen 0.—Succulent herbaceous often monœcious or dicœcious pl., with long shoots trailing or climbing by their extra-axillary tendrils. L. alternate stalked large or broad, palmately nerved. Stip. none or obsolete. Fl. reticulately veined, y., w., or greenish rarely rose or purple, scentless, axillary, either solitary or fascicled and stalked, or in axillary rac. or corymbs. Fr. mostly large, often eatable, but sometimes poisonous.

Tribe I. *CUCURBITEÆ.*

The Pumpkin, Cucumber, and Melon Tribe.

Anthers sinuous S-like. Fr. a gourd. Seeds numerous, with a watery or pulpy ultimately dry or membranous aril, attached to the inflexed or involute placentas or sides of the carpels.

†††1. CUCURBITA. Fl. monœcious axillary mostly *solitary* stalked. Cal. 5-fid, lobes distinct remote herbaceous, *base hypocrateriform* united to cor. Cor. 5-fid, *lobes united considerably above edge of cal.-cup.* MALE: anthers united or cohering into a compact oblong head or column rather longer than its stalk, their fil. connivent and combined together into a single pyramidal stalk, the whole *exserted much above the cal.-cup.* FEM.: *throat of cor.* more or less *closed by a lobed fleshy crown.* Styles mostly 3 combined downwards; stigmas mostly 3 large thick ovate bilobed distinct. Fr. a many-seeded gourd, *openly or flatly and widely umbilicate at top.* Seeds flat bordered; coat (*testa*) shelly.

†††2. LAGENARIA. Fl. monœcious axillary mostly *solitary,* stalked. Cal. 5-fid or 5-partite, lobes distinct remote herbaceous. Cor. 5-*partite, lobes distinct down to edge of cal.-tube or ovary.* MALE: cal. 5-fid, *base tubular-campanulate* united to 5-partite cor.; anthers cohering into an oblong-

oval head or column much longer than its stalk *not exserted beyond the cal.-tube*, their fil. connivent combined. FEM.: *cal. and cor.* 5-*partite, base none* or reduced to a very narrow rim or ring, *sep. and lobes of cor. distinct down to and sessile on the ov.* or very narrow rim or ring at top of it, *throat of cor. open simple*; *stigmas* 5 large distinct united on a short *single obconical stalk.* Ov. *lageniform or hourglass-shaped*, the lower part sterile, upper 3-celled. Fr. a many-seeded gourd flatly umbilicate at top. Seeds flat very distinctly bordered, truncate and auricled or bituberculate at top; coat (*testa*) shelly.

Tribe II. *SICYODEÆ.*

The Chocho Tribe.

Anthers sinuous S-like. Fr. a fleshy drupe. Seed single solitary pendulous; *placenta* not inflexed, aril none or indistinct.

†††3. SECHIUM. Fl. monœcious. Cal. 5-fid, lobes distinct remote herbaceous, base hypocrateriform united to cor. 10-ribbed or torulose. Cor. 5-partite, base cup-shaped with a ring of glandular pores or cells, lobes distinct or divided down to edge of cal.-cup. MALE: fl. in axillary rac., anthers umbellate distinct, their fil. united nearly to the top into a single stalk. FEM.: fl. solitary at base of male rac.; style 1 simple. Stigmas combined into a flat-topped calyptriform head. Ov. 1-celled 1-ovulate. Fr. obovate or clavate compressed with a nearly closed constricted sphinctral transverse umbilical cleft at top. Seed flat not bordered; coat (*testa*) leathery-membranous.

Tribe I. *Cucurbiteæ.*

1. CUCURBITA L.

Gourd or Pumpkin.

†††1. C. MOSCHATA Duch. *Abobora preta.*

Hirsutely tomentose or hirsute; l. large hoary dark lurid-gr. mottled or marbled with white, somewhat stiff and harsh, hispid, not prickly, 5-lobed cordate, lobes acute sharply toothed with acute and shallow or deep rounded sinuses; ovar. pubescent rounded even; fr.-stalk strongly 5-angular and 5-lobed at its insertion; fr. very large mostly globose flatly and obtusely ribbed pruinose, flesh deep orange scarcely fibrous, seeds pale brown (drab) shining ovate.—Duch. "Dict. Sci. Nat. ii. 234;" DC. iii. 317; Naudin in Ann. Sci. Nat. (sér. 4) vi. 47. *C. Pepo* A.

(La Melonnée) Duch. in Lam. Enc. Méth. ii. 152.—Herb. ann. Mad., PS., cult. reg. 1, 2, ccc. Gardens and fields chiefly below 1000 ft. everywhere. Fl. at most seasons; fr. Sept., Oct.—This, the ordinary and most esteemed kind of Pumpkin in Mad., is at once distinguished by its very dark lurid speckled foliage and thickly hirsute st. and petioles. St. prostrate spreading from 20 to 40 or 50 ft. long, $\frac{1}{2}$–$\frac{3}{4}$ in. thick, sparingly branched angular or ribbed, very dark lurid gr., stout tough and cord-like, hardened and woody downwards, hispid but not at all prickly-strigose, and like l. and petioles thickly hoary-villous or hirsute upwards. L. about 12 in. in diam., the disk spreading horizontally at right angles with the footstalk, hispid shining. MALE: fl. scarcely more than 3 in. in diam., somewhat smaller than in *C. Pepo* DC. (*A. de Machado*), orange-y.; cal.-cup or *torus* flat and shallow and like the sep. thickly villous-hoary or pubescent, the hairs hiding the nervation of the former; sep. always erect and adpressed to the cor.-tube or cup, flat thin or leafy and herbaceous to the tip, dark gr. linear acute. Cor.-cup with only 20 principal ribs viz. 3 to each segment and a single simple intermediate one from each sep.,—instead of 25 viz. 3 to each segment and a double or 2-forked intermediate one, as in the female fl. of the present and as in both male and female fl. of the two following sp.,—the whole inside clothed with short subglandular y. hairs, and the ribs outside hoary-villous. Stam. 3, their fil. thick smooth short distinct combined into a stalk not more and sometimes less than half the length of the oblong truncate anther-column, which is 8–10 lines long and 2–3 thick. FEM. FL. large 4–5 in. in diam. orange-y. perfectly sessile on the oval-globose quite even (not ribbed or angular) finely downy 3-celled ov., which is pale gr. mottled with 10 paler interrupted streaks. Cal.-cup very flat and shallow subpentangular, its segments or sep. like the cup itself dark gr. subfoliaceous not withering at the tips, spreading horizontally, very narrow, linear-acuminate or linear-subulate and very remote, $\frac{1}{2}$ in. long, with a pair of nerves forking from the base of each, one to each of the pet. or segm. of cor., which are 4 in. long from the base of the sep., with the midrib excurrent at the tip. Cor.-cup with 25 principal ribs, having an additional nerve on each side the 3 main ribs of the segments forking from the base of the sep.; the inside clothed, especially downwards, with y. glandular pubescence; the throat nearly or quite closed with a smooth shining pale y. waxlike fleshy tumid irregularly 5-lobed or divided crown, which is surrounded and tightly embraced by an outer inflexed faintly 3-toothed or sinuate smooth membranous ring or shallow cup, and composed of five large thick prominent conspicuous waved or plaited wart-like lumps or tubercles (abortive anthers) distinct but not remote from the 3-partite style-column. Styles 3 smooth combined downwards. Stigmas

3 very large ovate-oblong bilobed distinct deflexed orange. Fr.-stalk strongly 5- (rarely 6-) angular rather than ribbed or sulcate, dilated and distinctly 5- (sometimes 6-) lobed at its insertion, the 5 or 6 lobes being regular and quite independent of the number of ribs on the fr. Fr. varying considerably in shape size and colour, but normally its form is spherical, depressed flat or umbilicate at top and bottom, and more or less distinctly though irregularly and always very flatly and obtusely ribbed. From this it passes through globose to ovoid or obovoid (*La Melonée ou Courge muscade des Marsellais* Naud. l. c. 51. t. 2. B. ff. 3, 4), oblong (sometimes contracted in the middle), pear-shaped, or even clavate (*Abobora da Rocha*; *la Courge berbère ou bedouine* Naud. l. c. 52. t. 2. B. ff. 1, 2); and the numerous ribs, always broad and flattened, are often obsolete. The normal colour is a uniform dull dark gr., or when quite ripe orange-y. with more or less of a pink or salmon-col. tinge; and both these colours are seen perhaps still more frequently united in large irregular broad clouds or patches on the same fr. in its intermediate stages of maturity; the plain gr. and or. fr. occur continually also on the same pl. The whitish or glaucous bloom is never wanting in the ripe fr., and the skin is of a peculiarly fine smooth thin and even texture, wholly free from warts or tubercles. When half-grown or before maturity the fr. is of a peculiar dark blackish bottle-gr.; whence, and from the dark-col. l., probably, the name "*A. preta*" or Black Pumpkin. The flesh when ripe varies from salmon or orange-flesh-col. to deep carrot-red, being in the latter case peculiarly sweet or saccharine with a melon-like scent or flavour. There is always a large hollow cavity inside. Seeds shining minutely rugulose, pale or drab-brown, shortly ovate, 9 lines long, $4\frac{1}{2}$–5 broad, very distinctly bordered, the border raised and darker-coloured.

The fr. varies in size from 10 to 20 in. in diam. (transverse or axile), and in weight from 20 to 80 pounds (usually 30 or 40). The best-flavoured in Mad. of this sort are perhaps those produced on banks or slopes immediately at the back of the hot shingly beach of Magdalena, a village on the S. coast about 15 miles to the W. of Funchal.

Those who have only tasted the ordinary European Gourds or Pumpkins i. e. the fr. of *C. maxima* Duch. (*les Potirons* of the French, a sort not cult. in Mad.) or of *C. Pepo* L. (to which belong our English "Vegetable Marrows") can have little notion of the superiority for culinary and confectionary purposes of the fr. of *C. moschata*; which, however, even in Mad. vary much in excellence; those of Magdalena being, as before said, celebrated as the sweetest and most sapid. The soup made from the ripe

fr. most resembles that of the best carrots. But boiled when young i. e. from 2–4 in. in diam., and served up like Vegetable Marrows or Asparagus, they form perhaps one of the most delicate of vegetable esculents. Candied slices of the ripe fr. are also a favourite though insipid confect.

The importance of this esculent and its congeners in these and the Canary Islands can be scarcely overrated. What the Potato ever was in Ireland are Aboboras in these latitudes to all classes. For at least six months in the year (Aug.–Jan.) they constitute almost one-third of their daily nourishment: and from their facility of combination by boiling with fatty substances, together with their large supply of saccharine beside their farinaceous material, afford a most nutritious food, evinced by the surprising muscular powers of the Mad. peasantry.

The young l. and shoots when bruised or handled exhale a strong odour of musk: but the fr. has only occasionally any such scent or flavour.

There are two distinct forms or subvarr. in foliage of this sp.: one with the l. broadly angular-lobate, lobes simple short triangular, wider downwards, with acute shallow sinuses; the other with the l. deeply palmate-lobate, the lobes distinct, contracted downwards, with wide open sinuses, and compound or again themselves lobed.

Abobora da Rocha or *La Courge berbère* Naud. is a var., said to be constant from seed, with lageniform, pearshaped, or long clavate fr., of which the thinner stalk-like part or base is solid and barren, the head or club only hollow and fertile. Seeds rather larger and paler drab, viz. 10 lines long and 5 broad.

†††2. C. Pepo Ser. in DC. *Abobora* (or *Boganga*) *de Machado* or *de Catóa*.

Prickly-strigose or setose; l. ample very large rather deep full gr. *immaculate stiff very harsh and prickly* 5-lobed cordate, lobes broad acute sharply toothed with acute shallow sinuses; ovary subglabrous ribbed subangular; fr.-stalk strongly 5-angular ribbed and *sulcate, irregularly many-lobed* at its insertion; fr. large oblong or oval subangular *strongly and abruptly ribbed* shining *without bloom*, flesh *pale fibrous*, seeds *w. elliptic-oblong narrow.* —DC. iii. 317 (not Linn.); Naud. in Ann. Sci. Nat. (sér. 4) vi. 29. *C. Pepo* B. *polymorpha* δ. *oblonga* (Les Giraumons et

les Citrouilles) Duch. in Lam. Enc. Méth. ii. 152, 155.—Herb. ann. Mad. cult. reg. 1, 2, ccc. Gardens and about cottages chiefly above 500 ft., rather less universal than *C. moschata* and earlier in season.—A far inferior sort, larger and coarser in all its parts than the preceding, with very large stiff sharply but broadly and not deeply lobed l. 12–18 in. in diam. not set as usual at right angles horizontally upon their petioles, but rising obliquely and more or less uprightly from the top of them into a sort of funnel shape, of a uniform full (not speckled lurid) gr., more naked and shining or less hispid but much more harshly scabrous and prickly-strigose than in the last-named sp. The whole pl. is also of an altogether coarser more thickly shortly and irregularly branched and leafy habit, with branches leafstalks and principal nerves of l. (especially beneath) pale gr. succulent and naked, but sprinkled with stiff sharp pungent conical erect distinct short bristles. MALE FL. very large, often 4–5 in. in diam., orange-y. Cal.-cup or torus bristly moderately deeply cup- rather than bell-shaped, a little contracted at top subventricose strongly 10-ribbed subpentangular; sep. thick and fleshy-herbaceous to the tip, very long (more than an inch) and narrow, acuminato-subulate, sprinkled with short stiff bristles from a conical base or tubercle, somewhat spreading or erecto-patent. Cor.-cup strongly many-ribbed or nerved, having in addition to the 3 very strong gr. central ribs and 2 lateral of each segment several other intermediate smaller but sufficiently conspicuous nerves,—the whole inside smooth, but the ribs outside minutely pubescent and sprinkled with bristles. Stam. 3, their fil. very broad and large downwards nearly smooth or only partially and very minutely glandular-puberulous, forming a stalk rather shorter than the anther-column which is about 9 lines long and 3 thick. FEM. FL. rather smaller than the male, sessile on the oblong subangular strongly many-ribbed subglabrous or only very minutely and inconspicuously puberulous 3-celled ovary, 10 ribs of which are broader and stronger, 5 or more of them running continuously down the ped., which is very strongly ribbed, with deep grooves between the 5 main ribs, and bristly. Cal.-cup very short and quite flat or shallow, fleshy coarsely 10-ribbed bristly, its sep. short 4 lines long subulate bristly not withering at the tips, spreading or deflexed. Cor. very strongly 30-ribbed or thereabouts, with 5 more prominent ribs to each segment, the ribs bristly; the whole inside bristly-villous or pubescent; throat with a prominent erect very minutely puberulous stiff fleshy outer crown, thin and subtrilobed or sinuous at the edge, embracing a lower 5-lobed thick-edged waxy plicate inner one (abortive stam.) surrounding but distinct from the very thick short smooth 3-cleft style. Stigmas 3 very large distinctly 2-lobed velvety or spongy deep orange. Fr.-stalk strongly 5-angular and 5-sulcate, with 5

principal but other intermediate ribs in the deep grooves between them, and irregularly multangular and not merely 5-lobed at its insertion, but with angles nearly as numerous as the grooves between the ribs of the fr. Fr. oblong subclavate about twice as long as broad, 12–18 in. long and 6 or 8–12 or 14 in. in diam., smooth even (not warted) shining, entirely without bloom, slightly 10-angular, strongly and abruptly 10-ribbed, especially round the footstalk, where the ribs become very distinct regular narrow prominent and cord-like, 5 being alternately more abruptly so than the rest; colour an olive-gr. more or less mottled with bright golden-y., the ribs often entirely y., and sometimes the golden-y. prevails altogether over the gr. Flesh very pale yellowish salmon-col. A large hollow space in the middle. Seeds w. elliptic-oblong narrow very distinctly bordered and minutely rugulose, 10 or 11 lines long, 4 or 5 broad.

Though frequently cult., this sort is held in much lower estimation than the former, from which it is distinguished immediately by the funnel- or cup-shaped form and sharp lobes of the unspotted l. and by the coarse stiff prickly habit of the whole pl. The fr. is indeed of far inferior quality both in flavour and consistence, being at once more fibrous and insipid: nor does it usually attain so large a size, nor can it be preserved nearly so long as the *Abobora preta*.

Naudin in his valuable memoir on *Cucurbita* above quoted, divides this sp. by the fr. into the following artificial groups or varr.: each being again subdivided into subvarr. *a*, *b*, *c*, &c.

1. Les *Courgerons*; fr. middle-sized (8–12 in. in diam.) spherical depressed at the poles or with the axis shorter than the diam.
2. Les *Citrouilles*; fr. large or middle-sized (28–10 in. long) ovoid obovoid or elliptic, the axis not much exceeding twice the diam.
3. Les *Giraumons*; fr. large or middle-sized elongate, the axis distinctly exceeding twice the diam.
4. Les *Patissons* (a vaguely defined polymorphous group); fr. small or at most middle-sized, depressed or spherical. St. short upright.
5. L'*Orangin* or *Courge orangine* (=*Cuc. aurantia* Willd. and perhaps entitled to rank as a sp.); fr. small spherical. L. small indistinctly and obtusely lobed.
6. Les *Barbarines* (an ill-defined arbitrary group); fr. small variable in shape, &c., inedible. L. small very distinctly lobed.
7. Les *Coloquinelles* and *Cougourdettes* (scarcely separable from 6. and=*Cuc. ovifera* L., *pyxidaris* Duch., &c.); fr. small variable

in shape, &c., inedible, with a hard shelly coat. L. small very distinctly lobed.

The usual Mad. forms of this sp. belong to the 2nd of these groups, "Les *Citrouilles proprement dites*," and are referable especially to the subvar. "*b.* La *Citrouille de Touraine*" Naud. l. c. p. 36. t. 2 A. ff. 2, 11.

The common English "Vegetable Marrow" is rarely cult. in Mad. It is placed by Naudin in the 3rd of the above groups, Les *Giraumons*, and constitutes his subv. "*c.* La *Courge à la moelle*" p. 38. l. c.

†††3. C. MELANOSPERMA Braun. *Boganga.*

Hispid-pubescent; l. not large light-gr. immaculate soft and flaccid hispid-velvety indistinctly 5-lobed rounded-cordate, lobes equal regular rounded short obtuse minutely denticulate subentire with distinct open rounded sinuses; ov. downy rounded even; fr. middle-sized oval, very smooth and even, hard solid shining, without bloom, speckled gr. and w. or pure w., flesh pure w. firm solid, seeds black shining broad roundish-oval.—Naud. in Ann. des Sci. (sér. 4) vi. 53.

α. picta; fr. elegantly speckled gr. and w. like a snake's back. —*Boganga brava, B. rajada* or *B. Tenerifa.*

β. lactea; fr. uniform pure w. or cream-colour. — *Boganga branca.*

Herb. ann. Mad. cult. reg. 2, ccc. Grown perhaps more extensively and abundantly than either of the two preceding sp. in the whole Chestnut region of Mad. above 1000 or 1200 ft., covering the ground in fields or on banks as if perfectly wild, but rarely if ever trained on trellises, as *Abobora preta* and *A. de Machado* mostly are. Fl. throughout the year; fr. principally Oct., Nov.—The pale or light gr. soft foliage at once distinguishes this sp., and the smaller size and peculiar shape of the l. are equally characteristic. St. trailing extensively 20–30 ft. or more, sparingly or remotely branched, more slender than in either of the two preceding sp., pale gr., succulent, and, like the petioles and main ribs of the older l. beneath, harsh and almost prickly-strigose or hispid-pubescent. L. 6 or 8 in. in diam. rounded regularly palmate-lobed with distinct rounded very obtuse equal lobes and rounded sinuses, softly hispid or roughish-velvety but not harsh or stiffly strigose. Fl. (especially the male) produced copiously all over the pl. at all seasons, bright or.-y., 3–5 (sometimes 6–8) in. in diam. Cor. altogether smooth inside, subpubescent outside only on the nerves. MALE FL. mostly 3 or 4 in. in diam.; cal.-cup or torus bristly flat and shallow, sep. very small leafy linear flat acuminate $\frac{1}{4}$ in. long, mostly withered often black and dry, always spreading or recurved. Cor.-cup a little inflated, with 25 principal ribs, viz. 3 to each

segment and a single sepaline one giving off an additional side-branch or fork to each, but not always forking from its very base, as in the fem. fl. of *C. moschata* and of the present sp., and not reaching to the top of the cup. Stam. 3, their fil. distinct with a pit or pore at their base, but combined into a thick slightly glandular-pubescent stalk about the length (viz. $\frac{1}{2}$ in.) of the compact oblong anther-column which is truncate at each end. FEM. FL. much larger than the male, with the cal.-cup much shallower, the sep. longer ($\frac{3}{4}$ in. long) more gr. and leafy, linear-oblong, subspathulate and abruptly mucronate. Cor.-cup as in male, except that the sepaline nerve is mostly but not always forked quite from its base. Throat half-closed by a white thick but sharp-edged erect fleshy stiff 3-angular or 3-lobed outer ring or crown, about $\frac{1}{4}$ in. high or broad, and clothed inside and out with y. glandular pubescence, the 3 lobes or angles prominent spreading or recurved and mostly notched at the tip. Within this is a ring of pale wax-like depressed warts or tubercles (abortive anthers) like those of *C. moschata*, but much smaller depressed and inconspicuous, not prominent or tumid above the outer ring, and indeed scarcely discernible except in a vertical section of the fl. Styles 3 or 4 very thick distinct far down, channeled inside, slightly cohering at the base, quite smooth. Stigmas very large and distinct thick and short ovate bilobed densely velvety deep bright or. Ov. 3–4-celled oblong-oval thickly and shortly pubescent. Fr. exactly oval very constant in size, shape, &c., varying only in col., quite even, never ribbed, not hollow but finally splitting internally into 4 equal portions as if divided by a crucial incision with a knife; axis from 9–12 or 13, diam. 6–9 or 10 in. Flesh pure w. very firm and close, not pulpy but crisp, with a peculiarly sweet and nutty taste when raw, watery fibrous and insipid boiled. Seeds imbedded in the compact mass formed by their condensed spongy strings and arils, 10 or 11 lines long, about 7 broad, shortly oval, indistinctly bordered, very finely punctulate-rugulose, shining, very dark coffee-brown or black. Aril indistinct, not watery, blended with the flesh.

In *C. moschata* the inner warts or tubercles (abortive anthers) in the fem. fl. are developed at the expense of the outer ring or cup, which is reduced to a mere thin skin or membrane. In the present sp. (as in *C. Pepo*) it is exactly the contrary: the outer ring is thick fleshy high and well developed, but the tubercles within are obsolete depressed and inconspicuous.

Though affording a large supply of food to the poorer classes, this is a very inferior sort even to *A. de Machado*, but valuable for its great productiveness and long duration, the latter pro-

perty recommending it for good sea-stock. It is, however, scarcely eatable except quite young, having even then a vapid somewhat bitter taste when boiled. In the Canaries it is more commonly cultivated than any other sort, under the name (at least about Orotava in Tenerife) of "Pantana"; and in Palma the favourite elegant but insipid preserve called "Angel's Hair" is made from the long spongy strings (*funicles*) of the seeds.

C. maxima Duch. (Naud. l. c. p. 17. t. 1. ff. 1–11) has only now and then occurred in some of its curious coronated smaller-fruited Turk's-cap varr. (les *petits Turbans* of the French) with the carpels projecting above the cup-shaped recept. or at the top of the fr., and cult. merely for the singularity or beauty of the latter. The larger edible sorts, with or without a crown to the fr., so much grown in France, and also (especially the latter) recently in England (le *Turban rouge* and the netted or smooth *Potiron maraîcher* ou *jaune*, the netted being commonest in Paris and the smooth in England), have never been observed by me either in the Canaries or Mad. Though the fr. of the smooth *Potiron jaune*, at least as grown in England, is vastly inferior in flavour to that of the Mad. *C. moschata*, it much excels that of the Boganga (*C. melanosperma*); and the great size which it frequently attains (1½–2 ft. or more in diam. weighing 100 lbs. and upwards) might make this var. especially valuable in Mad.

With much the habit and foliage of *C. Pepo* Ser., especially as to the strigose asperity of the st., leaves and l.-stalks. *C. maxima* is at once distinguishable as a sp. by the thick corky round or clavate merely striated (not sulcate ribbed or angular) fr.-stalk. The fr. in the common smooth *Potiron jaune* is a remarkably depressed sphere, hollow at the poles, with a very short axis compared with its diam., very faintly or obsoletely ribbed, and of a uniform pale ochre-y. without bloom. The flesh is or.-y. and pulpy, but with little flavour or sweetness. The seeds are elliptic-oval sharp-pointed at one end, 9–11 or 12 lines long, 5–6 broad, faintly and minutely granulato-rugulose, very pale or quite w. and with a narrow border. The l. differ from those of *C. Pepo* Ser. in their blunt or rounded shallow lobes, and in being set horizontally on their petioles, which, though strigose like the st. with harsh stiff bristles, can scarcely be called prickly.

†††2. Lagenaria Ser.

Bottle Gourd.

†††1. L. vulgaris Ser. in DC. *Cabaça.*

Greyish or hoary and softly pubescent or subtomentose: st. upwards petioles and cal. villous almost shaggy; l. soft and flaccid broadly triangularly-cordate or angularly rounded scarcely

lobed, indistinctly and remotely repand-toothed; tendrils mostly bifid; fl. white stellate; ov. thickly villous; fr. finally smooth, hourglass-, pear- or club-shaped perfectly even, flesh pale or whitish.—DC. iii. 299. *Cucurbita Lagenaria* L. Lour. Fl. Coch. ii. 592; Desf. ii. 357; Brot. i. 311; Spr. iii. 45. — Herb. ann. Mad. cult. reg. 1, 2, c. Grown chiefly in or about Funchal, and only here and there occasionally elsewhere; the fr. from its bitter taste, except whilst young, being less employed for food than for making water-jugs or bottles, for which purpose, when the flesh and seeds have been scooped out, the hard thin woody rind renders it available. These vessels soon, however, crack and become useless, especially when large and formed from the full-grown fr. The smaller flasks from the smaller-fruited var. *β*, such as are often worn suspended round the neck by travellers, &c., are more durable. Fl. Sum., Aut.; fr. Sept., Oct.

a. Gourda Ser. in DC. l. c. (Cabaça grande); fr. large 1–2 ft. long, unequally hourglass-shaped.—A large climbing musk-scented pl. spreading extensively on trellises or climbing tr. to a considerable height, 30 ft. or more, with thickly matted branches and pale greyish foliage. Branches thin and slender pale gr. or whitish. L. greyish or hoary immaculate not large 3–5 in. in diam. openly cordate and often broader than long, repand-angular or sinuate rather than lobed, fringed with minute remote abrupt or subulate teeth, and with a pair of pits or hollow glands beneath at their base in the axil of the nerves at the top of the petiole. Fl. axillary mostly solitary rarely 2 or 3 together, about 2 in. in diam., wide-opening like a star; pet. about an in. long w. reticulated with gr. veins. MALE FL.; cal.-tube 7 or 8 lines long, rather more funnel- than bell-shaped, many-nerved or striated, thickly tomentose, its lobes 4 or 5 lines long erect linear-subulate thickish tomentose, their tips often withered. Cor. without tube, its segm. divided down to the edge of cal.-cup and petal-like, each strongly 5-nerved downwards, oblong-lanceolate, about an in. long and 3 or 4 lines broad, thickly pubescent on both sides. Fil. 3 very short and quite smooth, distinct below, uniting at top into the large thick oblong truncate anther-column, which is 4 lines long or twice the length of the fil. and nearly 3 lines thick. FEM. FL.; cal.-tube reduced to a narrow ring or short neck at the top of the ov.; sep. distinct remote erect 3 or 4 lines long, much shorter than in male fl., subulate pubescent; pet. 5 oblong-lanceolate, distinct down to base of sep. or top of ov., 5–7-nerved or ribbed, about an in. long and 3 or 4 lines broad; throat of cor. simple without crown or ring, but with 3 distinct erect barren fil. Ov. unequally 2-ventricose, densely tomentose. Styles perfectly united into a single very short thin smooth column shortly 5- or 4-branched at top. Stigmas mostly 5, sometimes 4, smooth

white clavate unequal irregular distinct on very short stalks or branches of the style-column. Fr. finally smooth 1–2 ft. long pale gr., with a hard woody but thin even rind, the upper and larger fertile portion hollow 6–9 in. in diam., the lower much smaller barren solid. Flesh in the upper part about 2 in. thick, pale or whitish, very bitter except when quite small and young, and then only watery and insipid. Seeds remarkable in shape, something like a hand-barrow or Skate's egg, oblong contracted at the base into a triangle with the point downwards, with a broad continuous thickened border produced at the upper truncate end into 2 prominent obtuse or rounded knobs or auricles, one at each corner, and completely surrounding or separating at top the central lanceolate-oblong panel-like compartments of the *testa* on each side. They are 10 or 11 lines long × 4 broad × 1½ thick, very inconspicuously or obsoletely punctato-rugulose and of a uniform more or less pale coffee-brown col.

β. *pusilla* (Cabaça pequena); fr. small 3–6 in. long unequally hourglass-shaped.—Differs from *a.* in its altogether smaller size and much smaller fr. and seeds, the latter being 7 or 7½ lines long × 3 or 3½ broad × 1 or 1½ thick, with the border interrupted at top by the meeting of the upper points of the central panel-like lateral compartments; the 2 auricles or tubercles at top are also much less distinct and prominent than in *a.*

γ. *clavata* Ser. (ε. in DC. l. c.; Cabaça comprida); fr. large 3 or 4 ft. long narrow-oblong or cylindric clavate.—Like *a.* except in fr. and seeds, the latter being as large but with the auricles at top smaller and less prominent though more pointed or acute, and the border completely interrupted at top by the lateral compartments lapping over continuously like a band from one side to the other.

The Cucumber, "Pepino" Port. (*Cucumis sativus* L.), abounds in May and June. Melons, "Meloes" Port. (*Cucumis Melo* L.), are fine and well-flavoured; but the pl. do not flourish, being greatly infested with a white mould (*Oidium* or *Erysibe*). The large more or less netted var. (*a. reticulatus* Ser. in DC. iii. 300), and the still larger smooth Maltese (γ. *Maltensis* Ser. in DC. l. c.) are the sorts chiefly cult. The Water-melon, "Melancia" Port., with red or white flesh (*Cucumis Citrullus* Ser. in DC. iii. 301; *Cucurbita Citrullus* L.) is only rarely cult., but it is imported from Lisbon in considerable quantities in the Autumn. The peculiar deeply laciniato-sinuate foliage at once distinguishes the pl.

Tribe II. *Sicyodeæ.*

†††3. SECHIUM Br.

†††1. S. EDULE (Sw.). **Chuchu or Chocho.** *Pepinella* ou *Cahiota.*

St. roundish and with stalks of l. tendrils and rac. smooth ribbed or striated; l. cordate-angular flaccid nearly smooth or naked and entire, sharply lobed whilst young, finely scabrous or hispidulous above, sprinkled with a few soft hairs beneath; tendrils 4-fid; *fem. fl.* mostly solitary sometimes binate; ov. obovate or clavate mealy-pubescent; fr. the size of the fist, compressedly turbinate or shortly obovato-clavate, prickly-strigose. —Spr. iii. 47; DC. iii. 313. *Sicyos edulis* Sw., Jacq., Lam.— Herb. per. Mad. cult. reg. 1, 2, c. In and about Funchal, at the Mount, Porto da Cruz, S^ta^ Anna, S. Vicente, &c., almost everywhere in gardens and about houses. Aut. chiefly.—Varr.:

α. Fl. and fr. pale gr.

β. Fl. and fr. rather larger, cream.-col. or w.

Habit and foliage of a Cucumber rather than of a Gourd. Rootstock or rhizome large amorphous massive corky rather than fleshy or woody. St. ann. slender tough but succulent shining pale gr., climbing extensively by the long-stalked mostly 4-cleft strongly curling opposite-leafed tendrils, and becoming thickly matted. L. 5 or 6 in. in diam. strongly cordate with the basal lobes approximate, rounded but more or less distinctly 5- or 6-angular, and whilst young sharply 5–7-lobed like Ivy-leaves, with the middle lobe produced; thin and flaccid, rather dark gr., immaculate slightly shining and appearing naked, but finely roughened or scabrous on the upper surface with hard very minute sharp conical scattered dots or pimples (bulbs of mostly undeveloped hairs); beneath smooth and even or with only a few soft scattered hairs, and with the nerves and veins curiously bordered; the edges nearly or quite entire. MALE FL. in short whorled long-stalked axillary rac., small, ½ in. in diam., pale greenish in *α*, cream-col. or w. in *β*, with a very slight but delightful Peach-like fragrance or like the fl. of the common Can. *Tournefortia* (*Messerschmidia*) *fruticosa* L. fil. or of the Mad. garden *Cestrum Bella sombra* Dun. in DC.; 5-angular depressed and mealy-crystalline in bud, with the gr. cal.-lobes or sep. erect and conspicuous. Rac. 1–3 in. long on a stiff ribbed or angular mostly curved smooth stalk 2–4 in. long, with the fl.-buds crowded or agglomerate upwards and the tip often hooked or curved; the lower fl. shortly pedicelled, finally remote and deciduous. Cal.-cup flatly hypocrateriform or saucer-shaped, combined with and resembling in col. and consistence the cor., pubescent, 10-nerved, the nerves forming the midribs of its segm. and of those of the cor. and dividing it into 10 compartments, flatly umbilicate beneath or

with the pedicel slightly *intruse*. Sep. smooth gr. herbaceous remote stiff narrow ovate-acuminate or lanceolate, erect in bud, afterwards stellately spreading or ascending, about ½ the length of pet. and contrasting strongly with the latter by their leafy char. and col. Cor. very pale gr. or in β. cream-col., of a thickish waxy substance or appearance, thickly and shortly (like the cal.-cup) crystalline or glandular-pubescent inside and at the edges, smooth outside, 5-fid down to the rim of cal.-cup, the lobes thickish ovate often rather obtuse, erecto-patent flat, not reticulate but with about 10 close-set parallel straight simple equal nerves or lines; the throat with a ring of 10 simple pores (*foveolæ*) exuding honey, 2 at the base of each segment. Anth. 3–5 mostly 4 sinuous distinct or umbellate; fil. united downwards into a smooth single stalk or column combined at the base with the cor., as in *Malva* or *Lavatera*, and slightly glandular. Fem. fl. towards the ends of the branches, mostly solitary, sometimes 2 binate on one stalk, on a short thickly mealy-pubescent axillary pedicel at the outer base of the stalk of the male rac. and opening some time before the development of the latter, having an abortive leaf and branchlet with fl.-buds undeveloped at its outer base, and thus placed between the inner male rac.-stalk and the said abortive fl.-bud-branchlet,—the whole 3 being between the leaf-stalk and the tendril-stalk. Cal. and cor. 5-fid, the latter down to the rim of cal.-cup, both lobes and cup like those of the male fl. but the lobes narrower and rather longer, with the *foveolæ* or pits in the throat much larger, forming a distinct raised crown-like ring of cells with raised rib-like partitions at the bottom of the cup around but apart from the style-column, whilst the cup instead of being sessile on the pedicel is stalked upon the ov. or joined to the latter by a short distinct cylindric or angular mealy gr. equal slender brittle neck. Styles completely united to the very top into a single simple even smooth or very minutely glandular-puberulous cylindric w. column. Stigmas combined into a flat-topped umbrella-like single pale yellowish calyptriform head with deflexed sides and incurved or involute 10-toothed edges, the 10 teeth combined into mostly 4 lobes or sets; the whole resembling the *pileus* of *Leotia lubrica* (Scop.) or the fr. of a *Marchantia*, but more flat-topped. Ovary, except a smooth irregularly wrinkled scar-like transverse gr. space at base of the neck or stalk to the cor., thickly and shortly mealy-pubescent like its short pedicel (in β. from the first mealy-w. or cream-colour), compressed turbinate or clavate, indistinctly or irregularly 5-grooved or lobed towards the top, uniformly 1-celled; ovule single erect attached by the middle of one edge to the wall of its cell. Fr. more or less compressed obovate or shortly clavate, very solid hard and heavy, pale gr. in α, cream-col. or w. in β, 3–6 in. long, 2½–3 broad at top, umbilicate and distinctly

4–5-lobed or grooved at base, often subtruncate at top and always sphinctrally rimate with an irregular deep transverse closed or narrow sinuous umbilical groove or cleft with tumid sphinctral knuckle-like or puckered coarsely ribbed or plaited lips, penetrating about halfway down to the seed and looking like the closed uneven suture of a terminal transverse opening, although the fr. is from the first completely closed above the seed. Surface shining but coarsely rugged or uneven, irregularly and remotely grooved and more or less setose-echinulate or spinulose with scattered subremote erect stiff but scarcely pungent short gr. bristles. Flesh about an inch thick pale gr. in *α*, w. in *β*, hard firm solid fibrous inwards and gradually compacted and blending into the large compressed softish fibrous shell. Seed or kernel oblong-ovate compressed not bordered, like a large thin almond, point upwards, attached near the top of one of its edges, invested with a white smooth shining veiny thickish soft but firm somewhat leathery or spongy not watery or pulpy coat. Aril, if any, indistinct. Cot. large thin flattened foliaceous pure w., nutty or kernel-like and pleasant to the taste, especially when boiled. Radicle terminal at the upper pointed end. Alb. none.

Propagated by planting the whole fr., which, after germination of the seed, enlarges into a persistent subaërial rhizome. The fr. boiled is a favourite vegetable in Mad. during the aut. and winter months; resembling young pumpkins, but when ripe somewhat firmer, drier or more mealy in consistence, with a peculiar nutty flavour. I have never met with it in the Canaries. The larger cream-col. or w.-fruited var. *β*. is better looking, but not so good as the gr. *α*.

††Order XXXIV. PASSIFLORACEÆ.

The Passion Flower Family.

Fl. mostly perfect and regular. Cal. 5-partite more or less tubular at the base. Pet. 5 (rarely 0) imbricate in bud with often 1 or more inner filamentous rows or rings within the throat. Stam. mostly 5, monadelphous, their fil. united into a tube sheathing the gynophore or stalk of the free superior 1-celled ov. Styles 3–5 mostly 3. Fr. stalked 1-celled 3-valved mostly indehiscent and many-seeded, placentas parietal. Seeds with an often juicy aril, ovate or oval compressed, often punctate. Embryo straight in the middle of the fleshy albumen. Cot. leafy flat.—Mostly climbing shr. with axillary tendrils. L. alternate mostly stipulate, simple or palmate-lobate. Herbage somewhat fetid. Fl. mostly conspicuous axillary scentless. Ped.

mostly 1-fl. and often involucrate at top. Fr. often esculent with a hard fleshy rind, somewhat between a gourd and berry; occasionally dry and membranous.

††1. PASSIFLORA. Cal.-tube very short with several rings of filaments in the throat. Sep. pet. and stam. 5. Styles 3. Ov. stalked. Fr. indehiscent baccate mostly pulpy or juicy, rarely dry or subcapsular.—Shr. climbing; l. stipulate, with glands on petioles. Sep. shortly horned or hooded. Seeds arillate.

††1. PASSIFLORA L.

Passion Flower.

Granadilla. Maracujá.

§ *Granadilla* DC. A 3-leaved involucre close under the fl. Ped. 1-fl.; a simple tendril from the same axil.

††1. P. CÆRULEA L. *Flôr da Paixão.*

L. smooth 5-partite, lobes oblong-lanceolate entire, petioles with 4 glands at top; stip. falcate; involucral bracts ovate entire; crown of fil. shorter than sep.—BM. t. 28; Desf. ii. 323; Brot. i. 477; DC. iii. 330.—Shr. per. Mad. reg. 1, 2, c. Waste or uncultivated spots amongst vineyards and cottages in the neighbourhood of Funchal, at the Mount, &c., quite naturalized. Fl. at most seasons; fr. Sum. Aut.—Branches slender but tough and woody, climbing and interlacing tenaciously by the branched axillary tendrils, and soon becoming thickly matted. Foliage dull dark smoky or lurid gr. subglaucescent, the young l. and shoots dark violet or purple. L. often 7–9-partite with fine narrow lobes. Fl. handsome about 2 in. in diam.; pet. pale bluish or greenish, the rings or crown of fil. blue. Fr. pendulous about 2 in. long and an in. in diam., narrow-oval or elliptic sometimes clavate, of a beautiful bright orange or red-lead col.; pulpy, but with an intolerably nauseous taste and quite uneatable.

P. quadrangularis L. BM. t. 2041, with simple stiff coriaceous shining ovate-oblong or elliptic parallel-ribbed l., large handsome scarlet and blue fl., and fr. (called *Maracujá*) the size of a turkey's egg, pale yellowish-gr. when ripe, with the pulp pale greenish w. like a gooseberry, and a honey-like smell and taste, is often seen growing over arbours in Funchal, for which purpose it is well suited, forming with its matted branches a thick close perennial shade. *P. edulis* Sims BM. t. 1989, with 3-lobed shining serrate l., and *P. Lowei* Heer, with large broad simple entire cordate subglaucescent l., are also common in gardens: the fr. of the former (*granadilla*) about the size of a small hen's egg, shortly and globosely oval, having a hard thick corky-coriaceous violet or purple rind and orange-col.

pulp with a fine raspberry-like flavour: that of *P. Lowei* Heer (which as a sp. seems too nearly related to *P. serratistipula* DC.), called also *Maracujá*, being larger (about 4 in. long) and elliptic-oval, having a thinner softer or more yielding rind of a y. or when fully ripe bright orange-y. or red-lead col., with mostly a strong pruinose or glaucous bloom, and with a pale bluish-gr. and very juicy pulp like a gooseberry, is much the best fr. of the three. Its seeds were first sent to me from Tenerife by the Hon. C. E. C. Norton and Miss Young in 1836–7; but it seems now to be altogether lost there. *P. edulis* Sims was introduced from England by the late Mrs. Penfold and myself in 1828 or 1830.

Order XXXV. PARONYCHIACEÆ.

The Knotwort Family.

Fl. perfect mostly regular. Cal. 5- (rarely 3–4-) partite, sep. persistent imbricate or subvalvate in bud. Pet. minute or rudimentary alternate with and as many as sep., sometimes 0. Stam. as many as and *alternate with pet.* i. e. *opposite the sep.*, sometimes fewer or twice as many, and sometimes more or less hypogynous; fil. free distinct. Ov. free superior, mostly 1-celled 1-ovulate, rarely 3-celled 3–many-ovulate. Styles or stigmas 1–3, often 2. Fr. dry capsular membranous enclosed in the persistent cal., mostly 1-celled 1-seeded, rarely 3-valved many-seeded with a central placenta, often indehiscent. Embryo more or less *curved round the farinaceous alb.* Cot. small.—Inconspicuous weed-like herbs or shr. with mostly opposite and connate, often fasciculate, sometimes whorled small entire l. and minute greenish or whitish tufted axillary or clustered cymose scentless fl. Stip. mostly present scarious or membranous.

Tribe I. *ILLECEBREÆ.*

Caps. 1-seeded. Cal. 5-partite *deeply divided almost tubeless*, persistent but *unchanged in fr.* Stigmas often sessile. Stam. perigynous.—L. opposite *with membranous stip.*

1. Herniaria. Sep. scarcely concave *simple.* Pet. 5 filiform inserted with the 5–2 stam. on a perigynous ring. Stigmas 2 nearly or quite sessile. Caps. 1-celled *indehiscent.*

2. Illecebrum. Sep. *snow-w. thickened or spongy hooded*, horned at the back. Pet. 5 scale-like or filiform inserted with the 2–5 stam. on a perigynous ring. Stigma single capitate or notched *sessile.* Caps. 1-celled 5-grooved *bursting along the grooves* into 5–10 parts. Embryo nearly straight.

3. PARONYCHIA. Sep. *not col. or thickened,* but slightly hooded and distinctly awned or mucronate. Pet. 0 or 5 linear. Stam. 5 or less. Style 1 *distinct,* stigma notched. Caps. 1-celled *indehiscent.* Embryo annular.

Tribe II. *SCLERANTHEÆ.*

Caps. 1-seeded 1-celled indehiscent. Cal. 4–5-*fid with a distinct* urceolate or campanulate *tube hardened in fr.* Styles 2 or 1 *distinct.* Stam. perigynous rarely hypogynous.—L. opposite connate *without stip.*

4. SCLERANTHUS. Cal. 5-fid, tube urceolate contracted at the mouth. Pet. 0 or 5 filiform. Stam. 5–10 perigynous inserted in the throat of cal. Styles 2 distinct.

Tribe III. *POLYCARPEÆ.*

Caps. *many-seeded* 1-celled 3(–5)-valved. Cal. 5-partite, deeply divided almost or quite tubeless, persistent but unchanged in fr. Style 1, stigmas 3 or 2 (or styles 3–5). Stam. hypogynous.—L. opposite or whorled *with membranous stip.*

5. POLYCARPON. Sep. keeled at the back, hooded at the tip. Pet. 5 notched. Stam. 3–5 or 1. Style 1 very short, stigmas 3. Caps. 3-valved.—L. broad often whorled in fours.

Here also perhaps belong *Lepigonum* Fr. (*Spergularia* Pers.) and *Spergula* L., supra in CARYOPHYLLACEÆ, p. 56; and I have modified (in brackets) the tribal char. accordingly. Professor Babington has satisfied me that I was wrong l. c. in adopting the name *Spergularia* instead of *Lepigonum* Fr.; the former being used by Persoon only sectionally or for a mere *group* (in his idea) of *Spergula,* and having thus no prior claim as a generic appellation over *Lepigonum* Fr.

Tribe I. *Illecebreæ.*

1. HERNIARIA L.

1. H. FLAVESCENS Lowe.

Ann. herb. densely hirsute-pubescent light y.-gr.; branches hard stiff slender wiry regularly distichous, altogether prostrate or flatly cespitose, thickly and shortly furry or velvety-pubescent; l. oblong-lanceolate, bristly on one or both sides and ciliate at the edges; fl. and fr. sessile in dense crowded many-fld. axillary fascicles or clusters, confluent into oblong leafy spikes on the side-branches; fr. thickly and equably echinate-setose.—Novit. 21 or 543. *H. hirsuta* WB.! i. 167 (not Linn.).

H. cinerea DC. iii. 367? Gren. et Godr. i. 612?—Herb. ann. Mad. reg. 1, rr; PS. reg. 2, 3, 4, c; SD. reg. 2?, r. Barren sunny ground, P^ta^ de S. Lourenço, at the top of the hill of the Piedade Chapel and beyond the Rocha furada. In P^to^ S^to^ general in cornfields, by roadsides towards P. d'Anna Ferr^a^, on the summit of P. Branco and on the top of the Ilheo de cima, &c. Apr., May.—A small insignificant weed, branched on all sides from the crown of the slender sparingly divided root and forming flat close-pressed regular dense patches from 2–6 in. in diam. of a peculiar pale apple or light y.-gr. and elegant pattern-like appearance, owing to the fan-like regularity with which the secondary or side-branchlets spread distichously and at equal distances and angles in the same plane on each side of the main branches, and become gradually shorter towards the ends of the latter, like the branches of a well-trained fruit-tr. on a wall *en espalier*. Root wiry tortuose or flexuose hard and somewhat tough but scarcely woody and decidedly ann., pale or whitish, scarcely or sparingly branched. Branches completely prostrate quite to their ends round hard stiff wiry straight or very faintly flexuose often red or purple, clothed with very short fine close-set horizontally spreading straight furry or velvety pubescence unmixed with bristles. L. small inconspicuous or overrun by the fr.-clusters, 2–4 or 5 lines long, $\frac{1}{3}$–$1\frac{1}{2}$ line broad, mostly naked, the lower sometimes more or less furry or velvety, but all sprinkled all over on one or both sides with spreading bristles and distinctly ciliate at the edges. Fl. minute gr. inconspicuous; sep. in fr. connivent shortly furry or velvety-pubescent and equably echinulate-setose or hirsute all over and not particularly at their tips or edges with stiff w. bristles spreading all round, their tips not distinctly aristate or bristle-pointed. Fr. rather large i. e. $1\frac{1}{2}$ millim. long narrow-ovate or elliptic compressed, thickly furry and equably echinato-hirsute or setose all over with longer straight w. bristles spreading on all sides and as long as the diam. or even axis of the fr., which bears a sort of miniature resemblance to that of *Xanthium* or *Ricinus*.

Scarcely perhaps distinct from *H. cinerea* DC., but the st. are wholly prostrate or flatly adpressed all their length to the ground, not ascending or with the ends upright, and there is no trace of a persistent woody rootstock or perenn. root. As to this last particular however, there is a discrepancy in authors: DC. e. g. calling the root in *H. cinerea* ann., Gren. and Godr. per. Still, in the absence of positive proof of identity from comparison with authentic spec., it is better to retain the Mad. pl. distinct provisionally.

It differs from *H. hirsuta* L. in being much more hairy or

hirsute, in having no distinct terminal awn or bristle to the sep., in the naked bristly l., and echinate-bristly fr.; from *H. ciliata* Bab. in the narrower longer lanceolate l., horizontally spreading pubescence of the st., confluent spicate clusters of fl. and fr., and echinate-bristly fr.; from *H. incana* L. in the sessile fr., &c.; and from all the preceding in the decidedly ann. not per. woody root and rootstock.

This is also a Can. sp. The late Dr. C. Lemann gathered it in Lanzarote in 1837, and I found it myself in Gr. Canaria and in Lanzarote in 1858, 1859.

2. Illecebrum L.

1. I. verticillatum L.

The only sp.—EB. 895; Brot. i. 302; Sm. E. Fl. i. 335; Buch 192. no. 148; DC. iii. 370; Seub. Fl. Azor. 45. no. 329; Koch 280; Bab. 123.—Herb. ann. or in swamps bien. or per. Mad. reg. 1, 2, 3, ccc. Mountain pastures especially in moist or swampy places, yet also in dry, and even in clefts or on ledges occasionally of rocks, general. W. bank of the Rib. de Joaõ Gomes above the Campo do Barco at Funchal; very abundant in the turf of dry mountain pastures about the Primeira Vista do Curral above the Jardim da Serra; in vast profusion and luxuriance in the swamps to the N.W. of the church at S. Antonio da Serra, &c. &c. Apr.–July.—Root fibrous properly perennial. St. cespitose gregarious slender filiform either (as in dry places) simple or nearly so, 2 or 3 in. long, more or less erect or ascending, or in wet or swampy ground much branched and creeping prostrate or trailing and procumbent, 6–12 in. long, forming dense cespitose masses, or sometimes a thick moss-like bed.—Whole pl. smooth slender delicate and usually of short duration. Foliage bright gr. L. opposite small obovate spathulate or lanceolate obtuse or acute inconspicuous. Fl. sessile crowded in axillary confluent tufts or whorls, minute but conspicuous from their snow-white more or less tinged with pink or crimson shining china-like cal. which is alike elegant and curious in aspect as in structure. Pet. 5 very short narrow lanceolate membranous scales concealed by the wax-like white or crimson cal., each ending in a subulate point, not longer than the ov. or stam., and alternate with the curious hooded awned sep. Perfect or antheriferous stam. only 2, opposite the sep. not longer than the ov. Stigma decidedly single (possibly 2 combined into one) nearly sessile forming a simple truncate knob at the top of the ovate acute smooth ov.

It is remarkable that this pl., of such universal diffusion in

Mad., has neither been observed in the Açores, the Canaries, or Cape de Verdes, nor even in the neighbouring islands of Porto Santo or the Desertas.

Ill. cymosum, no. 149 of Von Buch's Mad. Catalogue, is a mistake, originating from some Mad. specimens in the BH., formerly marked *I. cymosum*, but which are certainly *Paronychia echinata* (Desf.).

3. PARONYCHIA Juss.

1. P. ECHINATA Lam.

St. diffuse or spreading sometimes prostrate or erect not much branched often simple; branches knotted or jointed puberulous on one side; l. elliptic or oblong-lanceolate mucronate minutely punctulate smooth finely serrulato-ciliate; fl. in axillary crowded subconfluent tufts somewhat secund; cal. glandular-strigose at the base; awns of sep. rather short slightly divaricate. —DC. iii. 370; WB. i. 162. *Illecebrum echinatum* Desf. i. 204; Brot. i. 302; Brot. Phyt. Lusit. i. 49. t. 22. f. 1. *Illecebrum cymosum* and *Ill. Paronychia* Buch! 192. nos. 149, 150 (not Linn.).—Herb. ann. Mad. reg. 1, 2, c. Sunny dry open hills amongst grass near the sea along the Caniço road a mile out of Funchal; W. bank of the Rib. de Joaõ Gomes above the Valle; Curral das Freiras, &c. Apr.–July.—An inconspicuous pl. with somewhat the habit of *Polygonum aviculare* L. though usually more erect. Root small fibrous whitish. St. more or less erect, always so at the base, mostly simple or dividing near the base into only 2 or 3 stiffish spreading branches 3–6 in. long, mostly red, clothed along one side with very short white deflexed minute pubescence. Foliage pale gr. turning black in drying. L. in pairs or presently fasciculate at the knots of the st., pointed at each end with a very short *mucro*, of a thickish substance, finely and closely punctate and crystalline-dotted, the margins ciliate with very short remote bristles or hairs pointing forwards, otherwise quite smooth. Stip. short narrow ovate or lanceolate quite entire finely taper-pointed or acuminate whitish membranous. Fl. small sessile in axillary gr. or reddish tufts. Cal. urceolate, the base swollen and densely clothed with short hooked or glandular hairs or bristles; awns of sep. simple slender setaceous moderately long slightly divaricate, subcucullate or with inflexed membranous borders at their base. Bracts lanceolate membranous whitish shorter than the fl. Pet. or scales none. Stam. 5 all perfect. Style one simple truncate and notched at the top. Ov. and caps. 1-seeded clothed with very short pubescence. Seed globose smooth shining.

Tribe II. *Scleranthea.*

4. Scleranthus L.

1. S. annuus L.

Ann.; sep. ovate acute subimmarginate as long as the strongly 10-ribbed tube, in fr. spreading.—Brot. ii. 171; Fl. Dan. t. 504; EB. t. 351; Sm. E. Fl. ii. 282; DC. iii. 378; Koch 281; Bab. 124.—Herb. ann. P^to S^to reg. ?, rrr. Raised in 1833 by the Rev. M. J. Berkeley in England from seeds collected by me in PS., June 1–5, 1832. It has not been otherwise observed by myself or any other subsequent botanist, and I have no note or recollection of the precise locality; but doubtless it must be looked for in the usual cornfield region, and somewhat earlier than June or even May.—A small inconspicuous useless weed in corn. St. 3 or 4 in. long slender or even filiform jointed or knotted procumbent or ascending, several from the crown of the fibrous root, the central erect, all branched dichotomously upwards. L. opposite presently fascicled, 4–6 lines long, ½–1 mill. broad linear or subfiliform acuminate, widened sheathing or connate and ciliate at the base. Fl. small gr. inconspicuous axillary or in terminal leafy heads or corymbose forked fascicles which are dense and compact in fl., loose and spreading in fr. Stam. 5–10. Sep. as long as the strongly 10-ribbed or grooved urceolate tube, ovate 3-ribbed, subimmarginate or very narrowly membranous-bordered; in fr. narrower-lanceolate more acute erecto-patent, the mouth of the tube being nearly closed by a membranous ring. Seed single rather large proportionately, squarish-ovate or 4-sided, light yellowish or reddish-brown.—Whole pl. nearly or quite smooth, the st. only minutely furry or puberulous on one side.

Tribe III. *Polycarpeæ.*

5. Polycarpon L.

1. P. tetraphyllum L. fil.

Fl. cymose triandrous; pet. notched shorter than sep.; l. obovate or spathulate in pairs, those of the st. in fours.—Desf. i. 115; Brot. i. 123; EB. t. 1031; Sm. E. Fl. i. 189; Buch 192. no. 151; DC. iii. 376; WB. i. 154; Koch 281 and 1024; Seub. Fl. Azor. 45. no. 330; Bab. 124.—Herb. ann. Mad. reg. 1, 2, 3, ccc; PS. reg. 1, 2, 3, 4, ccc; ND. r; GD. reg. 2 (highest peaks), r/2; SD. c/2. In cult. and waste ground everywhere, a universal weed. Throughout the year. — A useless insignificant weed, at first cespitose, then bushy, 3 or 4 in. high sometimes 5 or 6 in., bearing a profusion of gr. apparently apetalous fl. Whole pl. smooth shining. St. repeatedly dichotomous, at

first prostrate and trailing, then bushy diffusely erect. L. roundish-oval subspathulate obtuse attenuated at the base into a short stalk, very variable in size, from 2–6 or even 12 lines long and 2–4 or 8 broad, at first all opposite in pairs; hence var. β. *diphyllum* DC. and WB. l. c. seems scarcely worth distinction. Stip. inconspicuous minute membranous ovate acute often acuminate and hair-pointed. Fl. very numerous in large dense crowded terminal cymes or corymbs covering the whole pl. Sep. horned or mucronate and hooded, with a broad gr. serrulate keel and point, the margins pellucid white membranous. Pet. white inconspicuous half the length of sep. lanceolate obtuse or retuse i. e. minutely notched, after fl. nearly entire. Stam. only 3. Style single; stigma subcapitate subtrilobed.

Order XXXVI. PORTULACACEÆ.

Fl. perfect mostly regular. Cal. persistent in part or wholly, 2–5-partite, lobes imbricate in bud. Pet. often 0, 3–5 or 6 very fugacious and membranous, soon cohering and deliquescent at the tips, inserted at base of the cal.-tube. Stam. as many as and *opposite the pet.* often more or fewer but always *connate with them*; fil. free distinct. Ov. 1–8-celled. Style 1 or 0; stigmas 3–8. Caps. 1–8-celled bursting either all round transversely in the middle into two halves, or by 3–5 valves stellately at top; rarely indehiscent; placenta central. Seeds mostly numerous and with long funicles from the base of the cells of caps. Embryo curved round the central albumen.—Succulent herbs or shr. L. entire mostly alternate without stip. or with only an axillary membrane or tuft of hairs. Pet. very ephemeral or 0.

* *Sep.* 2, *imbricate in bud.*

1. PORTULACA. Cal. 2-partite coherent downwards with the ov., the upper bivalve part or limb separating all round from the lower and falling off with the lid of caps. Pet. 4–6 equal free or cohering only at their base, sometimes abortive. Stam. 8–15. Ovary roundish. Style 0; stigmas 3–8 elongate. Caps. subglobose 1-celled bursting all round in the middle. Seeds numerous attached to the central placenta by long persistent funicles.

** *Sep.* 3–5, *subvalvate.*

††2. TETRAGONIA. Cal. persistent 3–5- mostly 4-fid, its tube connate with the ov., lobes horned. Pet. 0. Stam. few variable in number. Styles 3–8. Ov. 3–9-celled; ovules 1 in each cell. Fr. coated by the fleshy cal., woody

or bony, mostly 4-cornered horned or winged at the angles, 1–9-celled indehiscent; cells 1-seeded.—Herb. or suffrut. with flat succulent l. and small inconspicuous axillary gr. fl.

3. Aizoon. Cal. persistent 4–5-partite free. Pet. 0. Stam. about 20 in 3–5 bundles, stigmas 5 sessile. Ov. free 5-angular. Caps. woody or bony 5-celled bursting hygrometrically with 5 star-like clefts at top; cells several or many-seeded.—Herb. or suffrut. with flat succulent l. and gr. or pale often small axillary sessile fl.

1. Portulaca L.

Purslane.

1. P. oleracea L.

St. prostrate or procumbent; l. fleshy wedge-shaped or oblong-spathulate, axils shortly fringed or bearded; fl. sessile inconspicuous.—Brot. ii. 257; Buch 197. no. 369; DC. iii. 353; Seub. Fl. Azor. 45. no. 328.—Herb. ann. Mad. reg. 1, 2, c. PS. r. Sum. Aut., but at most seasons.—Varr.:

a. sylvestris DC. l. c.; WB. i. 169. *P. oleracea* Koch 278. St. prostrate, sep. simply keeled. In bare open places, streets, roads, walks and paths about Funchal, &c. Cal. bivalve compressed beak-shaped or lepadiform; sep. boat-shaped sharply but simply keeled at the back tightly closing over the caps. Pet. usually abortive.

β. sativa DC. l. c. *P. sativa* Koch 178. *P. oleracea* DC. Pl. Gr. t. 123. St. ascending or diffuse, sep. membranous-winged. Amongst other herbage, in vineyards, gardens, waste ground by roadsides or in dry ditches about Funchal, Machico, &c., a common weed. Merely a more luxuriant form or state of *a*, from soil or situation larger in all its parts. Cal. as in *a*, but larger and with the keel of sep. membranous-bordered upwards. Pet. usually developed.

Whole pl. succulent smooth and shining, often altogether red or purple. St. in *a*. 2–4, in *β*. 6–8 in. long. L. in *a*. $\frac{1}{4}$–$\frac{1}{2}$, in *β*. $\frac{1}{2}$–$1\frac{1}{2}$ in. long thick fleshy obtuse or rounded at the end, attenuated downwards, more or less fasciculate towards the ends of the branches, very variable both in size and shape. Fl. sessile solitary or agglomerate in the axils of the upper l. Cal. of 2 unequal gr. compressed keeled boat-shaped sep. Pet. y. with a shining silky gloss, very frail and delicate, a little longer than the cal., often subabortive or at least not expanding except in a hot sun and for a few hours only in the morning, always closing and withering before noon. Seeds numerous minute orbicular-spiral with the radicle prominent like a minute depressed or discoidal shell, most elegantly grooved and granulated spirally, black and shining.—Occasionally used as a potherb.

††2. Tetragonia L.

New Zealand Spinach.

††1. T. expansa Murr.

St. herbaceous diffuse or ascending; l. stalked ovato-rhomboid subcordate; fl. shortly stalked subsessile; stam. in little tufts of 2–4 or 5 alternate with sep.; fr. 4-horned 6–8-seeded.—"Murr. in Comm. Goett. 1783, 13. t. 5;" Thunb. in Linn. Tr. ii. 335; DC. Pl. Gr. t. 114; Haw. Syn. 199; BM. t. 2362; Spr. ii. 526; DC. iii. 452.—Herb. ann. Mad. reg. 1, rr. Roadside near the Casa Branca to the W. and edge of the seacliff just out of Funchal to the eastward near the Jews' Cemetery; also "Brazen Head" Sr Moniz. Apr., May.—A somewhat coarse leafy succulent smooth dark-gr. pl. with numerous spreading stout ribbed or furrowed st. 6–18 in. long. Upper l. deltoid or hastate, lower cordate, all wedge-shaped or decurrent gradually at the base into the footstalk, 1–3 in. long and $\frac{2}{3}$–2 in. broad, flaccid-succulent not thick finely papulose. Fl. small inconspicuous solitary in the axils, y. or yellowish within. Fr. rather large hard and bony or woody.

A mere outcast from gardens, but appearing likely to become established and prove useful as an esculent. It was first introduced about 1825 by the late Mr. Consul Veitch.

3. Aizoon L.

1. A. canariense L.

Herbaceous pubescent; st. hard stiff woody altogether flatly prostrate thickly regularly and distichously branched in one plane from the crown of the root, leafy above, naked and bare beneath; l. alternate obovate- or spathulate-wedgeshaped, attenuated into the petiole; fl. axillary sessile; caps. with cal. in fr. woody crowded and adnate to the branches.—Desf. i. 399; Buch 197. no. 370; DC. Pl. Gr. t. 136; DC. iii. 453; WB.! i. 207. *Glinus chrystallinus* Forsk. Fl. Ægypt. Arab. 95; ejusd. Icon. t. xiv.—Herb. ann. Mad. reg. 1, r; ND. rrr; SD. reg. 2, cc. Dry barren sunny maritime hills and slopes. In Mad. only on Pta de S. Lourenço on the Ilheo dos Embarcadores beyond the bay called Labra. Abundant at the top of the SD., very rare in the ND., and not obs. in either GD. or PS.! Apr.–July.—Root simple taper tough strong and woody though merely ann., pale or w. St. numerous from its crown spreading all round quite close to the ground from 6–12 in. long, flexuose, with crowded regularly distichous alternate branches all in the same plane, bearing l. and fl. on their upper side only, naked and bare beneath and resembling some elegantly branched coral

or stone tracery work, very stiff and rigid tough or woody thick and flattened, appearing more strongly flexuose from the knobbed or thickened and dilated axils, and projecting regularly alternate adnate caps. Whole pl. usually of a peculiar apple- or light y.-gr. and thickly but shortly and inconspicuously pubescent. L. rather small and inconspicuous except towards the ends of the branches, about ½ in. long and 3 or 4 lines wide flaccid succulent and quickly withering, minutely pellucid-papulose, more or less obtuse, attenuated downwards into rather long petioles. Fl. small gr. star-like, bright apple-gr. or sulphur-y. within. Lobes of cal. half-ovate. Anth. y. subglobose. Stigmas 5 sessile filiform simple y. Caps. large, hard and woody, coated by the persistent woody 5-lobed cal., strongly pentangular and with the base broadly adnate to the branches, 2–3 lines broad, not quite so high, very numerous and becoming densely crowded towards the centre of the pl., broadly or shortly turbinate or cylindric-obovate, turning first purplish, then brown, bursting only with rain or moisture. Seeds very minute black shining kidney-shaped, elegantly ribbed and grooved spirally, the ribs granulate. In some of the Canary Islands (Lanzarote and Fuerteventura, where the pl. is called *Pata*) they are collected in times of scarcity and used for food; the meal obtained from them, mixed with barley, forming a coarse sort of "*Gofio*," which is the ordinary food of the poor in those sadly miscalled "Fortunate Islands."

The whole pl. continues long through the aut. and winter in a dried state on the surface of the soil unchanged in form though entirely lifeless, looking like some brown coral or zoophyte.

2. A. HISPANICUM L.

Herbaceous smooth roughly papulose; st. dichotomously branched straggling diffusely decumbent or ascending; l. opposite spathulate-oblong or linear-ligulate; fl. solitary sessile in the forks of the branches, the uppermost only apparently shortly stalked.—Dill. Hort. Elth. i. 143. t. 117. f. 143; Desf. i. 399; DC. Pl. Gr. t. 30; DC. iii. 454.—Herb. ann. PS. reg. 1 or 2 (lower part), rrr. Campo Debaixo, roadside and border of a cornfield along a road leading to some cottages at the E. base of Pico d'Anna Ferreira about 2 miles to the W. of the town in P^to S^to, in one spot only but plentifully. Apr., May.—Root small pale tortuose simple hard woody. Whole pl. smooth and succulent with the habit of a *Mesembrianthemum*, dark full gr. Stems diffusely spreading or even prostrate 6–12 in. long repeatedly branched sometimes almost erect and bushy. L. 1–2 in. long, 2–4 lines broad, in pairs at the forks of the branches, obtuse or only the uppermost subacute. Fl. rather large or about ¾ in. in diam., like those of some *Ornithogalum*; the uppermost not

really stalked but appearing so from the yet incomplete development of both or abortion of one of the branches of the fork in which it is as properly sessile as the lower fl. Thus the single branch below it has been apparently mistaken sometimes for a pedicel. Sep. 5 ovate or lanceolate, gr. outside, pure w. within, opening like a star, produced in fr. into ligulate or linear-acuminate long gr. leafy points. Stam. 10–12 not exserted. Fr. rather large obconic pentagonal subadnato-sessile invested with the persistent cal.-tube and 5-horned, as it were, with its unchanged (not hardened) spreading or erecto-patent lobes as long again as the caps. which is 4 or 5 lines long and broad. Seeds very small black, sculptured like those of *Portulaca oleracea* L. but with the radicle less prominent.

Abundant in Lanzarote close outside the town of Arecife on the south side, but omitted by Webb in his Canarian Flora, though Lanzarotan spec. from Bourgeau exist in BH.

Order XXXVII. MESEMBRIANTHEMACEÆ.

The Fig-Marigold Family.

Fl. perfect regular. Cal. persistent, the tube fleshy connate with the ov., 5- rarely 2–8-partite, lobes herbaceous mostly unequal imbricate in bud. Pet. *many indefinite inserted in the throat or top of cal.-tube linear or ligulate in several or many rows* rarely in one row, membranous, deliquescent and subconfluent in decay. Stam. *numerous indefinite in several rows* or rarely one inserted with the pet.; fil. free distinct. Ov. 4- or 5- many-rarely 1-celled; ovules many with long funicles affixed to axile sometimes parietal placentas. Stigmas as many as cells of ov. Caps. at first fleshy, then dry and somewhat woody, bursting when moist *longitudinally at the ventral sutures of the spreading or stellately divergent carpels.* Seeds many small; embryo curved round the central alb.—Succulent suffrutescent or herbaceous pl., with opposite or alternate thick and fleshy l. without stip. and conspicuous radiant y., purple, p. or w. mostly scentless fl. opening only in bright sunshine.

1. MESEMBRIANTHEMUM. The only genus. Char. that of the Order.

1. MESEMBRIANTHEMUM L.

Fig-Marigold.

* *Herbaceous, annual.*

1. M. NODIFLORUM L. *Barrilha.*

Evenly and finely papulose; st. branched procumbent or dif-

fuse; l. opposite or alternate fleshy subcylindric obtuse ciliated at the base; fl. axillary or terminal sessile or subsessile small; sep. 5 unequal cylindric like the l.; pet. small not longer than the outer sep.—Desf. i. 398; Brot. ii. 331; Fl. Gr. t. 480; Haw. Syn. 250, Rev. 166; Buch 197. no. 371; DC. Pl. Gr. t. 88; DC. iii. 447; WB. i. 205.—Herb. ann. Mad., PS., ND., GD. and SD., reg. 1, cc. Sunny slopes and waste ground near the sea; in Mad. chiefly on P^{ta} de S. Lourenço, at the Gorgulho and Praia formosa, &c.; in P^{to} S^{to} general, and in ND. most abund. Apr., June.—Whole pl. quite smooth, mostly more or less reddish purple, frosted with small crowded oblong equal not watery *papillæ*. St. 3–12 in. long spreading on all sides close to the ground, then ascending, sometimes suberect and bushy, round and slender, much branched, hard and woody. L. flaccid 3–6 lines long, 1 broad, subcylindric or subclavate flattened or slightly channeled above, round beneath, fasciculate on the young shoots. Fl. small 3–5 lines in diam. w. or pale flesh-col. with the eye yellowish, nearly or quite sessile, opening only in the hottest morning sunshine, closing about noon. Sep. all like the l. in shape and the 2 or 3 outer in size also, the 3 or 2 inner or shorter with broad membranous margins and 1 or 2 of them sometimes reduced to red-purple ovate-lanceolate fleshy-membranous pointed scales; the outer 2 or 3 longer subciliate and gibbous behind at the base. Pet. 2 or 3 lines long, $\frac{1}{2}$ or $\frac{3}{4}$ millim. broad, very narrow linear-ligulate rounded at the tip, w., pale p. or flesh-col., greenish-y. towards the base. Stam. 10–15 in a single row, half the length of pet.; anthers chrome-y. Styles 5 straight erect closely connivent or spirally twisted; stigmas chrome-y.; ov. gr. Caps. small erect hard 5-angular.

This is the chief in quantity if not in quality of the three Soda-yielding pl. of these islands, viz. *M. nodiflorum*, *M. crystallinum*, and *Sucæda* or *Salsola fruticosa* L. It is chiefly produced or cult. for the purpose of burning into Soda in the N. or Little Flat Deserta.

2. M. CRYSTALLINUM L. *Barrilha.* Ice-plant.

Coarsely and strongly watery-papulose; st. divaricately branched mostly prostrate; l. alternate flat undulate rhomboid or oval-wedgeshaped; the lower stalked, upper sessile; fl. axillary or terminal sessile; sep. 5 unequal flat ovate, pet. very narrow-linear longer than the sep.—Dill. Hort. Elth. ii. 232. t. 180. f. 221; Brot. ii. 331; Fl. Gr. t. 481; DC. Pl. Gr. t. 128; Haw. Syn. 243; DC. iii. 448 (*a* and *β*, *M. crystallinum* and *M. glaciale* Haw. Suppl. 91, 92, Rev. 157); WB. i. 205.—Herb. ann. Mad. reg. 1, rr; PS. reg. 1, c; ND. and SD. ccc. P^{t} de S. Lourenço about the Piedade only in Mad. Along the road to

the W. of the town in PS. and on the Ilheo Debaixo at the landing-place; most abundant in N. and S. D. but not observed in GD. Dry waste ground and barren places near the sea. May–July.—Root small simple. St. smooth round thickish strong tough and somewhat woody lying mostly quite flat and spreading from 6–18 in. all round. Whole pl. covered with large conspicuous prominent unequal ovoidal hyaline *papillæ* like drops of congealed dew or ice glittering in the sun, generally tinged more or less with bright red or purple. L. rather large flat waved or plicate succulent but not thick, flaccid and soon withering; the lower st. or root-l. large, sometimes 3–5 in. long, cordate-quadrangular or rhomboidal attenuated downwards into a broad petiole, the upper sessile about an in. long ($\frac{1}{2}$–2 in.) oblong oval or spathulate with an abrupt point; often more or less furry above at the edges. Fl. nearly or quite sessile numerous towards the ends of the branches pale p. with the eye greenish, 9–12 lines in diam. or 2 or 3 times as large as in *M. nodiflorum* L. and closing much later i. e. towards sunset or at 4 or 5 P.M. Sep. 5 unequal, 3 larger fleshy ovate or oval abruptly pointed short flattened and leaf-like: the 2 inner or smaller scale-like, sometimes horned at the back, broadly margined, bright crimson or red. Pet. twice as long as sep. $\frac{1}{2}$ in. long, $\frac{1}{2}$ mill. broad, pink towards the tips, w. downwards. Stam. numerous in many rows, scarcely half the length of pet.; anth. w. or very pale, not y. as in *M. nodiflorum*. Styles 5 simple straight erect closely connivent or twisted; stigmas pale simple. Fr. large and handsome about the size of hazel-nuts erect 5-angular hard dark purplish-red or crimson and abounding in juice, saturating and staining blood-red or crimson the feet of persons walking over large beds of the pl. which present at such times a striking and peculiar appearance. Might not this dye, like that latent in the cognate Cochineal-producing Cactus-tribe, be turned to similar account?

The two sp. formed by Haworth out of this, are certainly mere transitory forms or stages of the wild pl. In PS. the present sp. is preferred for making Soda to *M. nodiflorum* L., and it is there called *par excellence* "Barrilha." It is the common well-known "Ice-plant" of English gardens. The quantity of water it contains is quite astonishing. A person walking inadvertently over only a few pl. of it in the hottest weather and most parched up-ground, will soon find his boots or shoes completely saturated.

** *Suffrutescent, perennial.*

††3. M. CORDIFOLIUM L. fil.

Evenly and finely papulose; st. much branched prostrate or pendulous; l. opposite fleshy flat cordate stalked; fl. small axillary stalked; sep. 4 unequal, 2 larger opposite flat and leafy, 2 smaller conical or horn-like; pet. shorter than sep. —Jacq. Ic. Rar. iii. t. 487; Sm. Spicil. Bot. t. 6; DC. Pl. Gr. t. 102; Haw. Syn. 248, Rev. 159; DC. iii. 449; Spr. ii. 516.—Suffr. per. Mad. reg. 1, c. Waste spots and hanging down walls in the neighbourhood of Funchal, at Ponta do Sol, Magdalena, Calhêta, &c., and in the north at Porto de S. Jorge. Apr.–Aug., but at most seasons.—Whole pl. quite smooth, of a peculiar bright fresh gr., shining but scarcely or inconspicuously and very minutely frosted. St. thickly cespitose either quite prostrate or hanging down walls in thick close leafy masses 2–3 feet long, round hard and woody, but gr. L. opposite distinctly stalked ½–about 1 in. long and broad flat but firm and thickish or fleshy and brittle, cordate acute a little decurrent into the broad flattened petioles which are ¼–½ in. long. Fl. rather small 4 or 5 lines in diam. very double with many rows of pet., bright rose-purple, solitary axillary stalked; stalks erect subquadrangular thickened upwards. Sep. 4; 2 larger leaf-like, 2 alternate shorter horn-like. Pet. numerous crowded imbricate in many rows, shorter than any of sep. Stam. about 12 in a single row. Styles 5 short. Fr. rather large erect turbinate quadrangular half-immersed in the gr. persistent sep. smooth 4-celled.—*Papillæ* of whole pl. very minute and crowded equal round, not oblong prominent or watery.

††4. M. EDULE L.

Quite smooth and even, not papulose; st. stout creeping sparingly branched, the ends ascending, compressed 2-angular; l. opposite connate at the base fleshy sharply triquetrous and acuminate, slightly concave above, the edges and more distinctly the keel subserrulate; fl. large terminal stalked; sep. 5 very unequal horn-like or triquetrous like the l., pet. shorter only than the outermost sep.—Haw. Syn. 234, Rev. 119; Spr. ii. 524; DC. iii. 428. *M. falcatum majus* Dill. Hort. Elth. ii. 284. t. 212. f. 272. *Ficoides, seu Ficus Aizoides Africana, &c., Ficus Hottentottorum vulgo* Seba Thes. i. t. 19. f. 6.—Suffr. per. Mad. reg. 1, 2, r; PS. reg. 1–4, ccc. Mad. at the Mount, the Palheiro, Camacha, &c.; 3 or 4 miles up the Machico valley by the roadside, &c. PS. in vast beds along the beach to the E. of the town, and a little below the top of Pico do Castello. Fl. at various seasons, properly Sum.; up the Machico valley, 1500 ft. above the sea, early in March; in PS., at the back of the hot sandy beach, not in fl. at the end of May.—Whole pl. smooth

not papulose. St. 2–4 ft. long, forming large thick beds, yet sparingly branched, irregularly tortuose or flexuose, rooting here and there from the joints, the ends ascending upright, thick fleshy succulent compressed sharply 2-angular or 2-edged leafy pale gr. often reddish or purple as thick as the little finger, thinner brown hard and woody downwards and, as it were, jointed rough and rugged with the prominent dry sheathing bases of the old l. L. quite even without dots or *papillæ*, dark full gr., large fleshy 1½–3 in. long, ⅓ in. broad, ½ in. deep, the sides flat, the upper surface slightly concave with a raised tumid crescent-shaped or horseshoe-like stem-clasping wheal or border at the base, nearly straight or only slightly falcate or incurved acute, their sheaths hard tumid knobbed. Fl. solitary with erect very stout and thick strongly 2-edged ped. dilated upwards, without bracts, short but sometimes as long as the uppermost pair of l.; the fl. 2–3 in. in diam. opening only in hot sunshine, uniformly in Mad. pale faded straw-col., greenish towards the centre or base of the very numerous narrow strap-shaped pet. which are ¾–1 in. long and scarcely 1 line wide. Sep. fleshy horn-like and triquetrous like the l., spreading, very unequal, 1 or 2 being 1–2 in. long, the rest irregularly much shorter, all dilated and the smaller broadly so with a membranous or scarious wing or hood at the base. Stam. about ⅖ length of pet., very numerous in a broad crown-like ring, with small ochre-y. anthers. Stigmas 10 horizontally spreading or reflexed, subflexuose sigmatoidally like the rays of an *Ophiurus*.

I have never found the fr. such as could be called in any sense eatable, either in Mad. or at the back of the hot beach of Porto S^to^. Still at the Cape it has the char. in books of being so, at least with the Hottentots; and, which may be more worth attention, the leaves or shoots are said when boiled to be available for food.

The rapid spread in PS. of this pl. is most remarkable. Introduced from Mad. by S^r^ Joaõ Ant^o^ Pedroso in or shortly after 1834 along with *Tamarix gallica* L., it had already in 1855 overspread in vast beds the whole sandy region at the back of the beach about the town and chiefly to the eastward. I also found large patches of it on a bare flat rocky place a little below the top of Pico do Castello. It was introd. first into the neighbourhood of the Mount in Mad. by the late J. D. W. Gordon, Esq., about 1825.

There is a purple-fld. var. (Bot. Reg. 20. t. 1732), but it has not occurred in Mad.

M. formosum Haw. Rev. 145, DC. iii. 436, a lovely sp., allied to *M. spectabile* Haw. (BM. t. 396), but with grass-gr. (not glaucous) l. 1–2 in. long, shortly stalked corymbosely crowded binate or subternate large bright deep rose-pink fl. and decumbent or procumbent fl.-branches dying back after flowering, is a great ornament to Funchal from March to June, cult. in boxes or pots in balconies and windows: and a scarcely less striking cult. sp., though of shorter continuance in fl., which seems to be exactly, from its dark gr. not at all glaucescent l., *M. coccineum* β. Haw. Syn. 265, as distinguished varietally from *M. coccineum* DC. Pl. Gr. t. 83, Haw. Rev. 150, DC. iii. 438=*M. bicolorum* BM. t. 59 (not Linn.), has intense deep crimson or blood-red fl. with a metallic lustre perfectly dazzling in bright morning-sunshine, in which alone they open. A 3rd sp. occasionally seen with these in cottage gardens (e. g. at Porto da Cruz) and flowering at the same time, has also prostrate or procumbent st., short triquetrous but more fasciculate or crowded very glaucous l. ½–1 in. long, and very pale pink or flesh-coloured binate or ternate fl. It is a glaucous-leaved var. of *M. blandum* Haw. Suppl. 95, Rev. 147; Bot. Reg. t. 582; DC. iii. 436.

Order XXXVIII. CACTACEÆ.

The Prickly-pear or Cactus-tribe.

Fl. perfect regular. Cal.-tube connate with the ov.; sep. and pet. numerous undistinguishable imbricate (often distinctly spirally), either forming a crown at the top of the tube or in spiral bands around it, the crown or limb persistent or falling off together in one withered mass in fr. Stam. numerous in many rows with long fil. and small versatile anth. Ov. inferior 1-celled with vertical parietal placentas and many ovules. Style elongate more or less tubular, stigmas several (as many as placentas) linear. Fr. baccate succulent 1-celled umbilicate at top, with numerous hard bony seeds at first parietal, when ripe scattered in the pulp; alb. mostly none; embryo straight or curved.—Fleshy herbaceous, shrubby, or subarboreous mostly leafless pl., with globular columnar round or angular often flattened leaf-like jointed or moniliform fleshy st. or branches of a peculiar aspect, beset spirally with tufts of short bristles and often spines instead of l. which are either wanting or abortive and soon falling, rarely perfect. Fl. sessile mostly conspicuous and scentless, of short duration, sometimes nocturnal, w., y., or sc., r., p. or cr. Fr. often eatable.

†††1. CEREUS. Fl. trumpet- or funnel-shaped, sep. and pet. very numerous imbricated spirally down the long or distinct tube nearly or quite to the base of ov., deciduous in fr. Cot. 0 or very small?—St. elongate erect or creeping cylindric fleshy with a woody axis many-grooved and angular or flagelliform, armed with tufts of spines or bristles. L. none. Fl. large often w. and nocturnal. Ov. and fr. more or less imbricatedly scaled.

†2. OPUNTIA. Fl. cup-shaped; sep. and pet. numerous collected into a distinct tubeless rose or crown at top of ov., deciduous in fr. "Cot. flat leafy."—St. and branches very rarely altogether cylindric, mostly while young composed of thick flattened leaf-like fleshy joints becoming by age hard and subcylindric, armed with tufts of spines or bristles. L. minute subulate fleshy (like those of a *Sedum*) under the tufts of bristles, falling very soon. Fl. large y. or r. diurnal. Ov. and fr. armed with distinct dense tufts of deciduous *setæ*, otherwise naked.

†††3. PERESKIA. Fl. rose-like and tubeless at top of the naked ov.; sep. persistent crowning the naked fr. Cot. —? —St. and branches normal rounded woody with tufts of spines and axillary prickles. L. normal distinct flat fleshy not caducous. Fl. terminal panicled or solitary. Ov. and fr. altogether naked.

†††1. CEREUS DC.

†††1. C. TRIANGULARIS (L.). **Strawberry Pear.**

St. gr., only here and there jointed or constricted, creeping prostrate or climbing, wingedly-triangular remotely but regularly crenate; spines very short strong woody naked 1–3- or 4-nate in the notches of the wings.—Haw. Syn. 180; DC. iii. 468. *Cactus triangularis* L. BM. 1884.—Shr. per. Mad. reg. 1, $\frac{c}{g}$. Walls of gardens in and about Funchal. Fl. Aug., Sept.; fr. Dec., Jan.—St. throwing out long stringy pale roots, by which they affix themselves and climb extensively in large thick entangled masses over walls &c.: they are almost continuously triangularly-winged, and jointed or interrupted only for a short space cylindrically at very irregular remote intervals here and there; the three sides concave about 2 in. broad, the wings or edges sinuately crenate notched or scalloped at regular intervals of 1–1½ in., with a mostly single (rarely 2–4) inconspicuous strong erect woody spine, 1–1½ line long, from a small obsolete tuft of very short greyish or whitish *setæ* in each notch. Fl. very large, 6–9 in. in diam., w., gr. outside, opening about 8 or 9 P.M. and lasting only 8 or 10 hours, in fact withering soon after sunrise, disagreeably scented. Fr. rarely matured in

Mad., of the size and shape of a hen's egg, deep rose-colour. with the tips of its scales greenish; rind or flesh a line thick, deep rose; pulp fleshy subpellucid w., rather crisp and juicy but mawkish and insipid, full of jet-black ovate subangular small seeds.

In gardens are also cult. *C. flagelliformis* (L.) BM. 17; *C. grandiflorus* (L.) BM. 3381; *C. speciosissimus* Desf., BM. 2306; *C. serpentinus* Lag., BM. 3566; *C. peruvianus* (L.) DC. (Great Torch-thistle, at the Mount and Palheiro), &c.; *Epiphyllum phyllanthoides* (DC.) BM. 2092; *E. truncatum* (Link) BM. 2562, &c.: the two latter forming a link between *Cereus* and *Opuntia*, as the Torch-thistle *Cerei* do with the Melon-thistles (*Echinocactus*, *Melocactus*, &c.), of which also several sp. are commonly cult. in Madeira.

†2. Opuntia Tourn.

Cactus or Prickly Pear.

†1. O. Tuna (L.). **Prickly Pear.** *Tabaiba.*

More or less spiny dull gr. subglaucescent erect subarboreous; joints obovate-oblong or oblong-spathulate 2–3 times as long as broad; spines white short feeble weak and inconspicuous, 2–5-fascicled towards or at the edges, often solitary or wanting on the disk of the joints, from short thick tufts of pale or yellowish *setæ*; fl. gilvous i. e. dull tawny reddish-orange or flame-colour: fr. ovoidal or barrel-shaped truncate and widely umbilicate at top, pale gr., pulp pale greenish-w.—Haw. Syn. 188; DC. iii. 472. no. 13 (not *C. Opuntia tuna* DC. Pl. Gr. t. 138); Lowe in J. of Bot. i. 40 (excl. syn. *Cactus* (*Opuntia*) *Bonplandii* Humb. et Kth.). *O. monacantha* BM. 3911 (not Willd., DC., Pfeiff., &c.). *Cactus Tuna* Linn. Sp. Pl. (ed. 2) 669, 670 (excl. syn. Sloane Jam.). *C. Ficus indica* Lour. Fl. Coch. i. 306; WB. (*a* and *β*) i. 208 (not Linn.). *C. Opuntia* Buch 197. no. 368; Holl's List in J. of Bot. i. 21 (not Linn.). *Tuna major spinis validis flavicantibus, fl. gilvo* Dill. Hort. Elth. ii. 396. t. 295. f. 380 (misprinted f. 238 by Linn.).—Shr. or subarborescent, Mad. reg. 1, ccc; PS. reg. 1, 2, r. Seacliffs and in the whole maritime region of Mad. on the S. coast up to a height of about 1200 ft. everywhere in waste rocky places, especially about Funchal: not observed in the north; in PS. only here and there, to the W. of the town, in the Serra de Fora and Serra de Dentro. Fl. May–July; fr. July–Sept.—Usually about 6 ft. high, of a dull gr., approaching more or less to glaucous, but seldom decidedly so; st. and older branches ashy-brown rudely cylindric, sometimes as thick as a man's thigh. Joints hard or firm stiff thick flat and even, 9–18 in. long or more, 4–6 in. broad, ½–1 in. thick, obtusely oblanceolate or spathulate, always more or less elongate

and attenuated to the base. Spines scanty feeble short weak and slender, and except from their whiteness subinconspicuous, ¼–¾ in., rarely quite 1 inch, long, though sometimes in hot exposed situations or on dwarf stunted pl. and especially on strong vigorous young joints thrown out from the base of the old st. they are more developed both in length and quantity,—single, or even in luxuriantly growing pl. none at all on the disk or middle of the joints, and for the most part only 2–3- sometimes 4–5- rarely 6-fascicled towards or at their edges, more or less divaricate or deflexed, at first pale yellowish or straw-colour, but very soon bleaching into almost pure opake w., except at their tip and base, which remain subpellucid strawcolour or yellowish. The less copiously and shorter-spined state of the pl. passes so gradually into the more spinous, and is indeed often so transitory in the same individual, that although it has been mistaken for *O. monacantha* Willd. by one botanist of the highest eminence, and distinguished by Webb as a var. β, I cannot even follow the latter. It is indeed perhaps rather the more normal or at least usual form of the sp., especially as seen in cultivation, though Webb makes it var. β of the more spinous form, his α. But nothing can be more inconstant: not only the same pl. at different periods, but even different parts of the same pl. at the same period, exhibiting both the sparingly and copiously spined states. The spines, whether single or 2- or 3–5- or 6-fascicled, spring from thick tufts of pale yellowish or tawny-y. bristles (*setæ*) 2 or 3 lines long, like those of the fr., and equally penetrating and caducous on the slightest touch, leaving a short dense grey or whitish cottony wart or knob. They are renewed annually, even on the older joints, at the usual time of growth or flower-season, when an additional spine or two is also commonly put forth. Close below each tuft of bristles on the quite young fresh-developed joints is a small inconspicuous subulate fleshy *Sediform* l. 2–4 or 5 lines long, which almost immediately withers and falls off, and then the spines are developed in or close above its axils. Fl. diurnal scentless rather large conspicuous, 2 in. in diam., produced most abundantly from the edges of the terminal joints, of a peculiar dull orange- or flame-red i. e. between orange-red and dark wax or honey-colour, appearing clearer orange-y. by transmitted light; basket- or cup-shaped without any tube. Pet. erect or erecto-patent, set like a crown on the top alone or rim of ov., imbricate, the outer shorter and smaller with a broad green fleshy midrib at the back, or gr. altogether, the inner 1–1½ in. long, 1 in. broad, ovate or oval retuse or notched, often sublacerate. Stam. much shorter than pet.; outer fil. pale or., inner pink; anth. pale y. Style as long as stam. pink upwards, pale much swollen towards and again contracted at the base, fistulose throughout; stigmas 7 or 8 pale yellowish erect connivent into a close sub-

globose head slightly overtopping the anthers. Ov. inversely clavate or turbinate naked but with thick tufts of short fine y.-tawny bristles with pencils of stronger and longer projecting from them, arranged quincuncially or spirally, rugged or uneven and often plicate towards the base; ovules numerous, attached to the sides of ov. by short funicles. Fr. when ripe light apple-gr. or yellowish-gr., 2–3 in. long, 1½–2 broad, oblong-ovoidal subturbinate or a little contracted at the base, truncate and concave or cupped at top, even and scentless; pale greenish-w. or whitish within like a gooseberry, with brown or yellowish specks and stains, and small flattened round hard bony dusky-brown or or. seeds dispersed through the whole fleshy pulp, which is very melting cool and juicy, and though at first seldom relished as insipid, not ungrateful to the palate, possessing a flavour of cucumber or burnet (*Poterium*) combined with a very slight taste of melon in addition to its pleasant watery sweetness. In a bad feverish cold I have experienced its refreshing gratefulness and benefit. The collectors of the fr., on gathering them with a small sickle or pruning-hook (*podão*), at once clear them of their treacherous tufts of *setæ* by rubbing them strongly on the ground with the soles of their bare feet, which are too hard-skinned to suffer from the operation. In eating, the outer rind is adroitly split lengthwise and carved off, and the fleshy coherent pulp turned out whole and entire as from a case.

The deciduous fine short subtile pungent yet fragile bristles of the fr. or younger joints, if carelessly touched or handled, immediately penetrate the skin, insinuating themselves gradually even through the clothes; and being at once minute, fragile and transparent, are very difficult to extract, causing no small annoyance.

Any change of col. in the fl. of this pl. is a most rare and exceptional anomaly. Such variation has however occurred to me twice in Mad. in the course of 25 or 30 years, and once in the Canaries amidst myriads of pl. with fl. of the normal col. In Mad., April 10th 1837, a pl. a little below the Fort at the Louros on the Caniço road near Funchal bore *on the same branch with others of the usual col.* a single fl. of a bright clear y., with merely a few streaks on the outer pet. or sep. of the usual dull or.-red, and which seen apart might have been taken for a fl. of *O. vulgaris* Mill. (*Cactus Opuntia* L.). Again, June 11th 1847, on the path from S. Martinho down to the Praia formosa, I found a pl. amidst a bed of others of the common dull red-fld. sort, with several fl. of a uniform bright lemon-y.

And again once in Palma, one of the Canaries, above the village of Argual on the W. coast or La Banda, in the first week in June 1858, I saw a few y. fl. on a single pl. amongst a profusion of others of the normal colour. But these instances are far too rare to depreciate at all the diagnostic value of the proper dull or.-red hue of the fl., and are rather analogous to the occasional occurrence of a white Sparrow, Crow, or Blackbird, or, still more in point, of the Mad. white-fld. var. of the Common Broom (*Sarothamnus scoparius* (L.)) *supra* p. 123; though they may serve to put botanists or rather horticulturists on their guard against deception by such accidental and merely temporary aberrations; for these variations in this *Opuntia* do not seem to be permanent for even two years in succession.

In like manner an odd untimely fr. occurs occasionally in Mad. here and there in early spring or winter, produced from a late autumnal fl., which acquires, before dropping off shrivelled and juiceless without attaining proper ripeness though full-sized, a purplish-red or madder-colour: whereas the properly matured fr. in its season (July–Sept.) is uniformly more or less pale apple-gr. or yellowish without the slightest tinge, outside or inside, of red or purple.

This is the only sp. employed in the Canaries for raising Cochineal. It had existed however universally in all the islands long previous to the introduction of the insect, or at least to its becoming an article of commercial importance,—a condition indeed of not more than 30 or 40 years' standing. It is recorded by Webb i. 209, and his account was confirmed to myself upon the spot, that the first introduction of the insect was violently opposed by the country-people, especially at Guimar in Tenerife, on the ground of its rendering the "*Tuneras*" or pl. of *Opuntia* barren, and injuring the crops of their favourite fr., called "*Figos*," which are even now much used in Fuerteventura and Lanzarote both fresh and dried.

Attempts have been made lately very zealously and carefully in Mad. to cultivate the Cochineal on this pl.; but they have all proved wholly unsuccessful, mainly from the difficulty of preserving or obtaining, when lost, in a remote island, fresh "seed" (young insects) to restock the pl. annually.

Webb, writing probably from memory after leaving the

Canaries, has singularly confused and misunderstood the two sp. common in those islands: one of which, and by far the most universal and abundant, is exactly the present pl. First, he reverses the col. of their fl., calling them "lutei" in the more widely diffused glaucescent less copiously and more shortly w.- or pale-spined very common sort with dull or.-red fl. and ovoidal truncate widely umbilicated gr. fruit,—and "sordide flavi" (and the fr. "late umbilicati") in the more specially littoral greener thickly or copiously spinous long and slender y.-spined sp. with bright sulphur or lemon-y. fl. and pear-shaped more narrowly umbilicated purple fr. And secondly, he almost more strangely mistakes or inverts their names and syn.; calling "*O. Ficus-indica* L." the first, which, by its pale or whitish mostly short and scanty spines, gr. truncated ovoidal fr. and dull orange-red or flame-col. fl., is the common Mad. pl. and assuredly the true *Cactus Tuna* of Linnæus, clearly identified by his reference to Dill. Elth. 396. t. 295. f. 380 (errore typ. quoted f. 238); and referring the second—which by the very numerous long slender y. spines, short rounded joints, the pear-like form, purple flesh and tinging properties mentioned by him of its fr., and by the pure pale lemon- or sulphur-y. fl. mostly uniform in tint, but occasionally (as observed in Lanzarote) tinged or streaked outside with reddish, is as clearly Dillenius's next sp. at p. 398. t. 296. f. 382—to "*Opuntia Tuna* Mill." or *Cactus Tuna* L.

With such confused ideas or recollections of the two pl. themselves, the synonymy and notices of the Linnæan and other sp. in the Phytogr. Can. are necessarily full of errors. Yet Linnæus had clearly enough defined his *C. Ficus indica* by the words "spinis setaceis" as being entirely devoid of thorns, which he terms "spinæ subulatæ"; and although his synonyms of *C. Tuna* plainly comprehend two sp., viz. Dillenius's f. 380, "Tuna major &c. fl. gilvo," and Sloane's t. 224. f. 1, "Opuntia major &c. fl. luteo," yet his diagnosis, by the words "articulis ovato-oblongis," refers to the former rather than the latter, which is described by Sloane "folio" (i. e. articulis) "oblongo-rotundo," and which moreover, by his following words "spinis longis et validissimis confertim nascentibus obsito, fl. luteo" and by the distinctly elongate-pear-shaped "purple" fr. attenuated downwards, is very distinct from the pl. of the Hort.

Eltham. 396. t. 295. f. 380 and clearly synonymous with the Dillenian pl. at p. 398. t. 296. f. 382,—a sp. not taken up by Linnæus and partly confounded by him with his *O. Tuna*, but which is certainly at once the *O. Dillenii* (Ker) and the Canarian littoral copiously long and slender y.-spined y.-fld. pl. with purple pear-shaped fr., miscalled by Webb "*O. Tuna* Mill." and of which the diagnosis and correct synonymy stand thus:

O. Dillenii (Ker); spinosissima pallide glauco-virens subhumilis, artic. subabbreviatis latiusculis rotundato-obovatis ovalibusve lat. $\frac{1}{2}$–$\frac{3}{4}$ longitudinis æquante, spinis subulatis flavidis longis tenuibus validis confertis horridissima; fl. luteis v. sulphureis extus sæpe rutilis v. rubescentibus, fr. elongato-pyriformibus purpureis.—*Cactus Dillenii* Ker in Bot. Reg. iv. t. 255. *Opuntia Dillenii* Haw. Suppl. 79; DC. iii. 472; Wight Ill. Ind. Bot. ii. 50. t. 114 (outer pet. with a red midrib, as occasionally in the Canaries). *Opuntia Tuna* WB. i. 209 (not *O. Tuna* Mill. or *Cactus Tuna* L.). *O. amyclæa* Ten. Fl. Nap. iv. 270. t. 236; DC. iii. 474. *Cactus Opuntia* var. C. (text), *C. Opuntia tuna* (plate) DC. Pl. Gr. t. 138 (not *Opuntia Tuna* DC. Prodr. iii. 472. n. 13). *Tuna major* spinis validis flavicantibus, flore sulphureo, Dill. Hort. Elth. 398. t. 296. f. 382. *Opuntia major*, folio oblongo-rotundo, spinis longis et validissimis confertim nascentibus obsito, flore luteo, Sloane Hist. ii. 149. t. 224. f. 1.—Hab. in siccissimis apricis littoralibus Ins. Canariensium vulg.—Approaches nearest to *O. nigricans* (Haw.) = *Cactus Tuna* γ. *nigricans* BM. t. 1557, but differs notably by its shorter and broader more rounded joints which are mostly much less and never more than twice as long as broad, y. spines and sulphur or lemon-y. fl. It is called in G. Canary *Tunera da India*; and though not otherwise employed in raising Cochineal, the long (1–2 in.) and very slender spines are used generally in the Canaries for affixing the rags impregnated with the young insect-brood to the plants of the true *O. Tuna* L. The fr. is scarcely eaten. I have never seen this sp. either wild or cult. in Mad.

Cactus coccinillifer (or on the plates *cochenillifer*) of DC. Pl. Gr. tt. 137 (two pl., viz. fl. and fr.) is referred by DC. himself, but obviously by mistake and under the wrong name of *Cactus Opuntia Tuna* in Prodr. iii. 472, to *O. monacantha* Willd., from which it is totally distinct by its tufted or many-fascicled rather short

spines and pale-red fl. It is with more probability asserted by Sir W. J. Hooker in BM. tt. 2741, 2742, as before by Haworth (Syn. 188), to be the *Cactus Tuna* L. (not DC. Pl. Gr.); but I am extremely doubtful of its precise identity with that sp. as here restricted and defined, on account of the very numerous spines in each fascicle and the purple or madder-red fr.; though it may just possibly have been some unusually spinose cult. form of it with the fr. unnaturally coloured as it occurs sometimes out of season in the Mad. pl.

Cactus Opuntia C. (inscribed on the plate *C. Opuntia tuna*) DC. Pl. Gr. 138 has the spines on the whole too long and numerous for the common Mad. and Can. pl., with moreover pale lemon-y. fl. stained or streaked outside with reddish, and the fr. described as "rouge." The joints agree in shape with those of the true *O. Tuna* L., but their glaucous tint cannot be relied upon, being the common col. in the work resulting from gr. colour-printing. It is remarkable that in his Prodr. DC. does not refer at all, not even under his *Opuntia Tuna*, to this figure. And on the whole, notwithstanding its reference in BM. t. 3911 to the present sp. *O. Tuna* (L.) and by Haworth (Syn. 189) to his *O. nigricans*, I must rather consider it to belong to *O. Dillenii* (Ker).

Other sp. of *Opuntia* occasionally seen in gardens in or about Funchal are—1. *O. cylindrica* (Lam.) DC. iii. 471; BM. 3301; habit of a *Cereus*, st. cylindric suberect only here and there branched, arcolato-tuberculose not jointed, spines setiform feeble 2- or 3–5- or 6-fascicled, fl. red rather small.—2. *O. brasiliensis* (Willd.) Haw. Suppl. 79; DC. iii. 474; BM. 3293; st. erect virgate terete, spines strong long numerous subsolitary on the somewhat thin and sinuated joints, fl. y., fr. y.—3. *O. monacantha* (Willd.) Haw. Suppl. 81; Ker in Bot. Reg. 20. t. 1726; DC. Prodr. iii. 472. no. 15 (excl. syn. "DC. Pl. Gr. n. 137 cum tab. 2," quoted as "Cactus Opuntia Tuna," but called in Pl. Gr. l. c. *Cactus coccinillifer* or on the plate *cochenillifer*); with large thin waved or flaccid full grass-gr. almost stalked oblong-lanceolate or elliptic joints 2–4 times as long as broad armed with very long strong slender spines 1½–3 in. long, solitary or in pairs, naked at their base, rather small golden-y. fl., the outer pet. red or streaked with red outside, and copious longish pear-shaped fr. dull ruddy red or purplish on the upper side till ripe, and then pale apple-gr. or yellowish tinged with reddish.—4. *O. vulgaris* Mill. Haw. Syn. 190; DC. iii. 474; BM. 2393; st. low diffuse, spines 0, fl. y., fr. purple.—5. *O. microdasys* Lehm., with rather small stiff ob-

ovate or oval joints, without spines, but elegantly and regularly thick-set with short dense tufts of conspicuous golden *setæ*, plain lemon-y. fl. and gr. fr., &c.

†††3. PERESKIA Plum.

†††1. P. ACULEATA Mill. **Barbadoes Gooseberry.**

St. climbing sarmentose the younger branches armed with short axillary deflexed prickles, the older with fascicles of long straight slender spines; l. oblong-ovate subacuminate; fl. in terminal panicles pale greenish-w.; fr. small globose y. crowned with some of the stiff leafy sep.—Haw. Syn. 198; DC. iii. 474. *Cactus Pereskia* L.—Shr. per. Mad. reg. 1, $\frac{c}{2}$. Arbours and walls in gardens in and about Funchal. Fl. Aug., Sept.; fr. (rarely perfected) Jan.–June.—A climbing shr. without any of the habit of a *Cactus*, with long weak slender straggling branches forming a thick entangled mass or canopy on walls or arbours of evergreen somewhat thick or fleshy foliage; the whole quite smooth except the buds which are a little woolly or hairy. L. alternate 2–3 in. long 1–2 in. broad veinless rounded or slightly cordate at the base acuminate whilst young. Prickles of young branches in pairs or solitary divaricate deciduous. Spines of st. or older branches in large bundles on the old axillary knobs or spurs, 1–2 in. long. Fl. in large terminal leafy racemose panicles, 1–1½ in. in diam., like little semidouble roses or those of *Calycanthus præcox* L., deliciously fragrant like Primroses or Cowslips. Fr. the size of a gooseberry amber-y. naked i. e. without scales or bristles, with 2–4 rather large seeds surrounded with a mucilaginous pulp not unpleasant to the taste. In Tenerife at S^ta^ Cruz I found it in the little public walk or Alameda by the sea loaded in Febr. with ripe fr., which, under the idea of its poisonous nature, had been suffered thus to remain untouched. Seeing that I survived however the supposed rash experiment of eating the ripe berries, the rising generation of the town soon took courage; and to such effect, that in a few days I could no longer find a single berry for myself.

Rhipsalis salicornioides Haw. Suppl. 83, BM. 2461, is also occasionally seen in gardens.

RIBISACEÆ or GROSSULARIACEÆ are very feebly represented in Mad. by a few Gooseberry and Currant bushes (*Ribes Grossularia* L. and *R. rubra* L.), cult. scarcely below 2000 ft.; the former principally about the Jardim da Serra, producing plenty of fr., which however mostly shrivels up without properly ripening or acquiring any flavour, and which is therefore only sold in its unripe state under the name of *Uvas Ingleses* to the English in Funchal in Apr. or May: the latter producing at most only a few miserable bunches.

Order XXXIX. CRASSULACEÆ.

The Houseleek Family.

Fl. regular mostly perfect. Cal. persistent; sep. 3–20, mostly 5 often fleshy more or less united at the base, imbricate or subvalvate in bud. Pet. *as many as and alternate with the sep.*, free or connected downwards, inserted at base of sep. Stam. *as many or twice as many as the pet.* and inserted with them. A ring of hypogynous glands or scales (abortive stam.) between the pet. and carpels. Ov. free; carpels as many as and opposite the pet., free or sometimes partially connected downwards, each produced into a short persistent simple style. Fr. of 3–20 one-celled many- (rarely 2-) seeded follicles bursting by a cleft or slit mostly at their inner suture, to which their minute seeds are attached. Alb. little or none. Embryo straight.—Succulent herbs or shr. with fleshy l. and no stip. Fl. mostly cymose w. or y., sometimes red or reddish, opening centrifugally.

1. TILLÆA. Sep. pet. stam. and carp. 3–4. *Pet. free distinct.* Hypogynous scales very small or 0. Carp. 2-*seeded contracted between the seeds.*—Minute inconspicuous moss-like herbs with opposite l. and axillary fl.

2. UMBILICUS. Sep. 5. Pet. 5 *cohering into a tubular-campanulate cor.*, with *straight erect acute* lobes. Stam. 10 *affixed to the sides of the cor.* Hypogynous scales 5 obtuse. Carp. 5 many-seeded.—Herbs with ann. fl.-st. and radical tufts of l. alternate on the st. Fl. w. or y. in simple or branched erect rac.

3. SEDUM. *Sep. and pet.* 5, rarely 4 or 6–8, the latter *altogether free distinct.* Stam. *mostly twice as many,* sometimes only as many. Hypogynous scales *simple notched retuse or lunate.* Carp. as many as pet. many-seeded.—Herb or $\frac{\text{Shr.}}{2}$. L. *often round or fusiform.* Fl. cymose w. pale purplish or flesh-col. and y.

4. SEMPERVIVUM. *Sep.* 6–20 *rarely* 5. *Pet. as many, connate at the base and with the stam.* which are *twice as many.* Hypogynous scales *various,* palmate or simple and in the latter case notched retuse or lunate, sometimes 0. Carpels as many as pet. many-seeded.—Herbs or shr. L. *flat or flattened.* Fl. cymose mostly y., sometimes w. or flesh-col.; cymes mostly paniculate often corymbose.

1. TILLÆA L.

1. T. MUSCOSA L.

St. procumbent or ascending branched and flowering from the base tufted; fl. axillary sessile trimerous.—Brot. i. 124; EB.

t. 116; Sm. E. Fl. i. 242; DC. iii. 381; ejusd. Pl. Gr. t. 73; WB. i. 175; Koch 282; Seub. Fl. Azor. 42. no. 302; Bab. 125. —Herb. ann. Mad. reg. 1, 3, r. About Funchal on the walls and in the bed of the Rib. de S^ta^ Luzia between the 2nd and 3rd bridges from the sea near the Bom Jezus; and also near the top of the Pico da Silva (about 3500 ft.), Sr. J. M. Moniz. Febr.–July. —An extremely minute insignificant pl., somewhat resembling *Paronychia echinata* (L.) in miniature, and covering walls or barren sunny spots with its often yellowish or reddish moss-like herbage. Whole pl. smooth. St. round slender filiform 1–2 in. long, prostrate and often rooting near the base. L. very small fleshy elliptic-oblong lanceolate or even linear mostly aristato-acuminate, the lower only obtuse, at first in pairs or opposite and connate at the base, afterwards thickly fascicled at the joints of the main branches, which thus become crowdedly whorled and spicate towards their ends. Fl. very small axillary all up the st. on the little short abortive side shoots which form the axillary fascicles of l. and so appearing crowded or agglomerate, sessile or shortly stalked trimerous; sep. aristate-acuminate gr. or reddish; pet. very minute narrow acute w. or flesh-colour.

I feel by no means certain that on closer study and examination on the spot (I describe only from dried spec.) this may not prove distinct from the sp. to which I have referred it. In foliage it agrees better with *Bulliarda* (*Tillæa* L.) *aquatica* of DC. and Koch; but the fl. are certainly only trimerous,—I can detect in them no "linear scales,"—and the carpels are not "polyspermous." This inconspicuous little moss-like pl. had escaped all observation till discovered by Sr. Moniz in 1860. From the remoteness, especially in elevation, of the two localities above indicated, it will probably be found more generally diffused, now that it has once been noticed.

2. Umbilicus DC.

Navelwort.

1. U. pendulinus DC. *Inhame de Galatixa.*

Root-l. peltate concave repandly crenate; br. entire; fl. pale y.-gr. inconspicuous mostly pendulous or drooping, throat contracted, segments short ovate, stam. 10 included.—DC. iii. 400; WB. i. 177; Koch 291; Seub. Fl. Azor. 42. no. 303. *Cotyledon Umbilicus* (β. L.), EB. t. 325; Brot. ii. 203; Sm. E. Fl. ii. 314; Buch 196. no. 359; Bab. 128.—Herb. per. Mad. reg. 1, 2, 3, 4, ccc; PS. reg. 4, rrr. Walls and rocks in Mad. everywhere. Pico da

Cabrita at the head of the Serra de Dentro in Porto Santo. Apr.–June.—A most variable pl. in size and characters. Root fleshy tuberous. L. chiefly radical of a somewhat dull leaden-gr., fleshy soft and flaccid, more or less deeply and widely crenate, 1–1½ in. in diam., round or roundish-reniform, mostly peltate and more or less concave and umbilicate or even funnel-shaped, sometimes rounded or orbicular-cordate and cut down to the always long round fleshy footstalk. Stem-l. broadly obovate or spathulate, the upper sessile. Fl.-st. single 2–12 or even 18 in. high, stiffly erect and straight. Rac. either simple constituting var. β. *peltatus* DC. l. c., or in finer pl. more frequently branched below with upright or adpressed branchlets: but these are forms dependent merely on the greater or less luxuriance of the pl. Fl. pentamerous small and inconspicuous of a pale dull greenish-y. very numerous in long erect leafy rac. crowded upwards, interspersed with sessile leafy deciduous lanceolate oblong or linear bracts, which are mostly entire but sometimes crenate-toothed. Tube of cor. oblong or slightly barrel-shaped about 4 times as long as the short ovate acute sep. and about twice as long as broad; lobes straight erect broadly half-ovate and acute or subcordate and apiculate, about ¼ length of tube. Stam. 10 in a double row, short, all included. The fl., especially the lower, are usually pendulous, but the upper and sometimes all nearly or quite erect; the length of their pedicels being very variable. The lower l. and br. mostly wither and disappear before the expansion of the upper fl. of the rac. Varr.:

α. fl. distinctly stalked and pendulous.—*U. pendulinus* DC. &c., l. c.

β. fl. nearly sessile spreading or erect.—*U. horizontalis* DC. l. c. (*Cotyledon horizontalis* Guss., Ten.)? Schmidt Fl. Cap. Verd. 258.—A not uncommon but trifling and quite inconstant aberration from the normal state α, by no means worth recording as a distinct var. Plants of it, possessing the further characteristics of more deeply cut less peltate l. and without a tuberous root, growing abundantly on dry rocks near the Waterfall at the head of the Rib. de Sta Luzia, acquired within six weeks when planted in my garden at the Valle, Funchal, a large tuberous root and drooping fl.: nothing but the l. remaining to distinguish them from the ordinary state α. of the species. The Portalegre and Marvão chestnut-wood var. *prœalta* mentioned by Brot. l. c. p. 204, Obs. 1, needs investigation, but was more probably this state of the sp. than, as Webb surmises, *U. luteus* (Huds.).

3. SEDUM.

Stonecrop.

* Leaves subcylindric.

† St. creeping. Fl. w. or flesh-colour.

1. S. FARINOSUM Lowe. *Erva Arroz.*

Smooth, mealy-whitish; st. cespitose creeping, suffrutescent and naked at the base, sparingly branched; l. crowded and imbricated upwards in 4–6 rows short subcylindric-oblong, flattened above and beneath, very obtuse, gibbously free at the base; cyme 2–3-partite; fl. unilateral subsessile; pet. 5 lanceolate slightly mucronate; hypogynous glands shortly wedge-shaped truncate or retuse.—Prim. 31.—Herb. per. Mad. reg. 3, 4, $\frac{r}{2}$. Dry woods and rocky banks between Pico Grande and the Encumeado de S. Vicente, all round the top of the Paul da Serra, Boca das Torrinhas at the top of the Lombo Grande and all the range of mountains at the head of the Boa Ventura, upper part of the Rib. da Metade, &c., but not found further than the Pôuso to the E., or anywhere much below 3000 ft. June–Aug. — Forming a turf of a glaucous or mealy-white appearance turning reddish in dry places; with creeping st. running amongst other herbage, 6–12 in. long, throwing out roots downwards, the ends ascending. L. about $\frac{1}{2}$ in. long scarcely $\frac{1}{4}$ in. broad like grains of rice in size and shape, pale glaucous gr. and mealy with their tips often red. Cymes mostly 2-fid rarely 3- or more-parted, the branches recurvedly spreading with a single fl. in the forks. Fl. white or inclining to red nearly sessile on one side of the divisions of the cyme stellate $\frac{1}{2}$ in. in diam. Sep. fleshy gr. acute. Pet. constantly 5, $\frac{1}{4}$–$\frac{1}{5}$ in. long, half as wide, white with the nerve outside often red. Hypog. scales short broader than long dark purple or red. Stam. 10 a little shorter than the pet., 5 spreading horizontally and lying on the pet., 5 alternate more erect. Fil. w. or reddish. Anth. very dark purple almost black, the pollen at first very pale greenish-y. Ov. w. or reddish, each produced into a long slender point or beak. Caps. beaked turning deep red as they advance towards maturity.

†† St. shrubby. Fl. y.

2. S. NUDUM Ait. *Uva de Rato*, or *U. de Galatixa.*

Smooth very dwarfish bushy; branches crowded numerous tortuous intricate naked downwards; l. cylindric-oblong or subclavate very short and obtuse; cymes few-fl.; pet. 5 narrow lanceolate; hypog. scales shortly spathulate distinctly notched.—DC. Pl. Gr. t. 155; DC. iii. 409; Buch! 197. no. 361; Haw. Syn.

117. *S. suffruticosum* Sol. MSS.? — Shr. per. Mad. reg. 1, cc; PS. reg. 4, r/2; GD. rr. Seacliffs everywhere on both the S. and N. coasts of Mad.: e. g., to the E. of Funchal, especially beyond Machico; to the W., especially at Paul do Mar, Pta do Pargo, &c.; in the N. at S. Vicente, Sta Anna, Fayal, at Larana near Porto da Cruz, &c. In Pto Sto on the rocky summits of Pico d'Anna Ferreira, P. do Concelho, P. Branco, and in the Serra de Dentro. July–Sept.—A small bushy pl. 3 or 4 in. high or rarely so much as 5 or 6 in., with very much branched interlacing stiff shrubby naked pale or whitish branches forming a compact thick tufted head. L. towards the ends only of the branches, mostly bright full gr., occasionally pale or glaucous, 1/8–1/4 in. long very obtuse sometimes clavate and a little flattened above. Fl. small greenish-y. inconspicuous in small mostly 3- or 4- sometimes 7–10-fld. cymes. Sep. thick fleshy ovate obtuse. Pet. greenish outside with a gr. nerve. Stam. 10 rather shorter than the pet.; anthers small purplish or brownish-y. Hypog. scales distinctly notched or almost bifid, remarkable for their or.-y. colour and thick or waxy appearance. Ov. large fleshy gr. triquetrous ending in a short simple style.

3. S. FUSIFORME Lowe.

Smooth dwarfish bushy glaucous; branches crowded numerous mostly tortuous naked downwards; l. lax spreading fusiform or thick in the middle and attenuated at both ends, somewhat acute and flattened above; cymes few-fld.; pet. 5 ovate-lanceolate slightly obtuse; hypog. scales very short lunate.—Prim. 31 (Cam. Phil. Tr. iv. t. 3. ff. 1, 2).—Shr. per. Mad. reg. 1, rr. Seacliffs on dry sunny rocks; W. of Funchal, on the Pico do Rancho above Camera de Lobos, and at the further or W. end of the top of the Cabo Giraõ; also E. of Funchal a little on the Funchal side of the Brazen Head, Sr. J. M. Moniz, 1858. July–Sept.—An altogether larger stouter pl. than *S. nudum* Ait. 5 or 6 in. high, with more lax spreading l. of a pale dull bluish-grey or glaucous colour 1/2–3/4 in. long and 1–2 lines thick in their broadest part or middle. Whole pl. perfectly smooth. Branches pale brown or greyish forked. L. most attenuated from their middle upwards, less so and a little thickened though not spurred at their base, sessile but free; flattened or even sometimes slightly channelled above with often a dull reddish-purple or dark stripe down the middle, rounded and convex or tumid beneath. Fl. larger and brighter y. than in *S. nudum* Ait. in about 5–10-fld. terminal cymes. Sep. 5 ovate-lanceolate acute fleshy gr. with often reddish edges. Pet. greenish-y. mottled or spotted towards the base inside with red. Stam. 5 rather shorter than the pet. and attached a little way up them, spreading wide open with the pet. Hypog. scales sessile very short and not visible without pulling down the pet., distinctly lunate.

Ov. large y.-gr. often with minute red specks at their base, produced into the short obtuse converging stigmas.

4. SEMPERVIVUM L.

Houseleek.

§ 1. *Aichryson* Webb. Herb. ann. or bienn., st. branched once-flowering. Fl. y. Hypog. glands palmatifid or digitato-fimbriate.

1. S. DIVARICATUM (Ait.).

Herb. ann. or subbiennial mostly altogether *smooth and shining*; st. *ascending* then erect stiffly fork-branched bushy *corymbose*; l. *distinctly and abruptly stalked, broadly rhomboidal or rhomboidally oval or obovate* minutely retuse *shortly and abruptly wedge-shaped at the base flat not thick or fleshy, dark full gr., forming before flowering a somewhat loose flat disk or rosette*, afterwards scattered and caducous; fl. *very numerous rather small in repeatedly forked cymes* forming a *broad close crowded* fork-branched *corymbose* panicle; pet. 5–8 mostly 6 or 7 narrow-lanceolate twice the length of the sep.; hypog. glands distinctly stalked abruptly palmate or cuneate-clavate mostly 4–6- or 7-fid subbilobed or bipartite with a subelongate wedge-shaped stalk.—Herb. ann. or partly bien. Mad. on trunks of Laurels, rocks, and walls abundantly, chiefly above 2000 ft.—Varr.:

a. polita; wholly smooth.—*Sedum divaricatum* Sol.! in BH.; Ait.! H. K. (ed. 1) ii. 108; Buch! 197. no. 360. *Anacampseros divaricata* Haw. Syn. 113. *Sempervivum arboreum* Sol.! in BH.; Buch! 197. no. 363 (not Linn.). —Mad. cc. Rib. Frio, de S^{ta} Luzia, da Metade, de S. Jorge, da Janella, at S. Vicente, P^{to} da Cruz, &c. June–Aug.—A very variable pl. in size and luxuriance though not at all in aspect or habit, ranging from 1 or 2 in. to 1 or even 2 ft. in height. St. always horizontal quite at the base, then abruptly curved upwards and erect, varying from the thickness of a crowquill to that of the little finger, hard and stiff but rather fleshy than woody, very smooth even and shining, of a dark green or brownish olive colour, soon forking repeatedly into a flat-topped leafy head and with the branches and l. also becoming (especially in *β*.) dull reddish or dark madder-col. L. very smooth and shining dark full gr. nearly as broad as long, ½–1 in. in diam. rhomboidal with rounded angles, abruptly and shortly attenuated into distinct stalks, notched mostly at the tip, scattered on the st. and branches, soon falling off the former and main branches, flat succulent, not very thick or fleshy. Fl. very numerous crowded small, 3–4 lines in diam., bright-y., in close broad flat-topped forked panicles 2–6 in. in

diam. Cymes repeatedly forked racemose with slender branches. Pedic. rather long (1½–3 lines) fine and slender. Sep. 7, rarely 6 or 8, linear-lanceolate somewhat thick and fleshy quite smooth, erect and closely connivent after fl. Pet. 7, rarely 6 or 8, mostly about twice as long as sep., narrow-lanceolate acute spreading; rather pale golden-y., quite smooth and with a greenish midrib at the back; 1–2 lines long and half as broad. Stam. twice as many as pet. and about as long, but unequal, and sometimes only 10–12 in number. Hypog. scales irregularly palmate with a more or less broadly wedge-shaped flattened stalk, the head mostly bilobed and always cleft irregularly into several (2–8) short blunt unequal spreading or divergent branches, not always in one plane, resembling a *Clavaria* in miniature. Styles capitate divergent in fl., afterwards erect and more or less convergent.

β. pubescens; branchlets and l. of cyme pedic. and cal. minutely glandular-puberulous sprinkled with longer wide-spreading hairs.—Mad. r.; Rib. Frio occasionally with *a*; Seixal abundant. May, June.—In habit foliage and fl. agrees perfectly with *a*, but is almost always of a bright full madder-red col., coming into fl. a little earlier and soon passing over. Hypog. glands abruptly capitate-palmate the broadly flattened unequally 4–8-fid subbilobed head set on like a hammer or abruptly contracted into the distinct flattened oblong (not attenuated) stalk. This var. or state of the sp. may be easily mistaken for *S. dumosum*, but is distinguishable by its broad level-topped many-fid. crowded panicle, its somewhat smaller fl. and broadly rhomboidal abruptly stalked l. It abounds at Seixal 200–500 ft. above the sea on walls and rocks by the roadsides in May and June, becoming gradually smoother and later-flowering every 100 ft. of higher elevation till it passes completely into *a*.

This is a perfectly distinct sp. apparently from *S. aizoides* Lam., DC. iii. 411 (*Sedum aizoides* DC. Pl. Grass. t. 4), which by the fig. and description is a permanently shrubby pl. with the more lanceolate l. crowded in tufts or rosettes towards the ends of the naked woody branches and larger more golden-y. ("6–8-" or by the fig. mostly 9-petalous) fl. in a smallish racemose cyme.

S. divaricatum makes its first appearance in Mad. soon after the first autumnal rains, continuing through the winter flowerless in its discoidal leafy state till May or June; first beginning to flower rather later than *S. villosum* Ait. and perishing entirely in the ensuing autumn after once flowering. Cult. in an English greenhouse it is always bi- and sometimes tri-ennial, flowering 2 or 3 years in succession: yet retaining all along the

truly herbaceous (not woody or frutescent) aspect of its st. and branches, and acquiring nothing whatever of the peculiar habit and appearance of *Sedum aizoides* DC. Pl. Grasses t. 4.

2. S. DUMOSUM Lowe.

Herb. ann. or subbiennial *glandular-puberulous* at least upwards; st. *mostly erect from the base*, irregularly fork-branched and sometimes bushy, *rarely corymbose*; l. *attenuately stalked spathulate or narrow-obovato-lanceolate* obtuse notched at the tip, *much attenuated at the base into the petiole, concave or slightly channeled*, quite entire, *somewhat thick and fleshy pale subglaucous*, before flowering *erecto-imbricate* not forming a flat disk or rosette, afterwards scattered and caducous; fl. *rather large not numerous in short distinct once-forked cymes* forming a bushy leafy fork-branched by no means constantly corymbose or close and crowded panicle; pedic., cal., br. and upper l. glanduloso-puberulous; pet. 6–8, mostly 7, lanceolate rather more than twice the length of sep.; hypog. glands subsessile broadly and shortly cuneate-palmate mostly multifid and subbilobed with a very short broad stalk.—Herb. ann. Mad. reg. 2, rrr. On the side of a mountain peak or ridge 1000–1200 ft. above but overlooking the sea on the upper road from Magdalena to the Arco, at a place on the crest of the ridge between the two, called Os Moledos, amongst heaps or beds of bare loose rocky fragments and on walls. March–May.—Habit tree-like but only from 3 or 4 to 12 or 15 in. high with a regular naked trunk-like st. (1–2½ lines in diam.) and erectly branched head; normally hapaxanthous and only by chance more than ann. St. and branches erect thickish and succulent, robust round firm or hard and stiff but fleshy-looking, naked downwards but scarred and a little rugged with the raised marks of the fallen l., shining dark madder-red or reddish-purple, always minutely glanduloso-puberulous upwards and sometimes the same downwards, while young leafy all the way up, the l. falling as the fl. advance. St. mostly erect quite from the base, but sometimes a little curved at the bottom and rooting from the lower leaf-scars. Whole pl. finely glandular-pubescent smoother (sometimes quite smooth) downwards. Foliage altogether finer and l. narrower and longer than in *S. divaricatum*, neither collected into terminal tufts, nor forming a single flat disk or rosette before fl., but loosely imbricated all up the st. from the first, flat but concave above and somewhat thick and fleshy, shining and apparently smooth, but the upper at least, and sometimes the lower also, minutely glanduloso-puberulous; in shape spathulate or narrow-lanceolate with the tip obtuse notched and recurved, gradually attenuated downwards into the long channeled stalk, with the disk slightly concave, from ½–1 in. long, and 1½–2 or 3 (rarely

4 or 5) lines broad, of a peculiar pale glaucescent gr. turning as the fl. advance red or purple, and presently falling off from both st. and lower parts of the branches. Inflorescence usually more like that of *Sedum nudum* Ait. than that of *S. divaricatum*, the fl.-branches erect forked leafy forming a loose not always close level-topped or corymbose panicle, the cymes distinct and terminal very rarely more than once-forked, the forks short 4- or 5- to 9- or 10-fid. with the fl. not crowded, larger and of a darker or fuller golden-y. than in *S. divaricatum*, but smaller though darker y. also than in *S. villosum*; the whole panicle glandulose-puberulous in all its parts. Pedicels 2–3 or 4 lines long. Sep. not quite 1 line or 2 millim. long, narrow-lanceolate, dark gr., united into a cup-shaped base in depth equalling their length. Fl. 4–6 lines in diam., mostly 5. Pet. mostly 7 sometimes 6 or 8, lanceolate finely acute stellately spreading or reflexed, 2 lines or 4–5 millim. long, 2 millim. broad, bright golden-y., the midrib outside reddish. Hypog. glands golden-y. or deep orange shortly and broadly stalked flattened subcuneato-palmate as broad as long obscurely and irregularly subbilobed, each lobe unequally 2–4- or 5-fid. Stam. 12–16 a little shorter than the pet. Styles and ov. as many as and colour of the pet. smooth.

In drying this pl. stains the paper with bright greenish-violet and red or purple spots. My first acquaintance with it is due to Sr. J. M. Moniz, who in March 1861 showed me flowering examples of it in his garden which had been brought to him from Magdalena by a countryman. Till the present spring (1863), when I discovered its exact locality, it had remained imperfectly characterized. In season it is considerably earlier than the other Mad. *Semperviva*, losing its l. and passing out of fl. when *S. villosum* Ait. in its neighbourhood, at a lower elevation, is first coming in. And though assuredly not more than ann. and hapaxanthous normally in Mad., it has so much of a suffruticulose form or habit, that it might perhaps in cultivation or other favourable circumstances become suffrutescent or at least, like its near ally *S. divaricatum* Ait., subperennial.

The Canarian *S. tortuosum* Ait. (BM. t. 296), if correctly figured and described, must be very distinct from *S. dumosum* by its decidedly per. woody or frutescent habit, short thick Sediform or gibbous l. (by the fig. 3–4 lines long × 2–3 broad) crowded in tufts at the ends of the naked "tortuous" widely divaricate or declining branches, and simply "bilobed," not palmately fimbriate (4–10- or many-cleft and only obscurely or irregularly

2-lobed), hypog. glands. (See also Haw. Syn. 166 and Rev. p. 66.) From this, however, *S. tortuosum* DC. Prodr. iii. 411 and Pl. Grass. t. 156 slightly differs, approaching somewhat more to *S. dumosum*, by the larger more loosely tufted l. "11–12 lin. longa, 4–5 lata:" and *Aichryson tortuosum* WB. i. 184, with digitato-fimbriate or fimbriately subbilobed hypog. scales or glands ("squamis digitato-fimbriatis aut subbilobis, lobis fimbriatis"), exactly as in *S. dumosum*, seems to approach still nearer the Mad. pl.; though, like the pl. of Curtis and DC., still differing entirely in habit, viz. "caule fruticoso decumbente contorto" WB. l. c.

3. S. VILLOSUM Ait.

Herb. ann. *dwarfish thickly villous-pubescent glandular-viscid hoary*; st. *ascending* then erect, bushy and *corymbose* at top; l. *distinctly and abruptly stalked broadly rhomboidal* obtuse, *shortly wedgeshaped or subcordate at the base*, quite entire flat *pale hoary-gr. densely villous, at first forming a loose flat rosette*, afterwards scattered and caducous; fl. *rather large and numerous in few-fld. short crowded once-forked cymes* forming *a close leafy bushy corymbose broad* panicle; pedic. cal. br. and fl.-l. villous; pet. 6–9 mostly 8 lanceolate 2–3 times the length of sep.; hypog. glands distinctly stalked subclavate or narrowly palmate mostly 3–5-fid subbilobed with a narrow-oblong stalk.—Sol.! in BH.; Ait.! H. K. (ed. 1) ii. 148; BM. t. 1809; Buch! 197. no. 365; Spr. ii. 469 (not Haw. or Lindl.). *S. stellatum* Sm. Tr. Linn. Soc. i. 251; Haw. Syn. 166, Rev. 66; DC. iii. 412.—Herb. ann. Mad. reg. 1, 2, 3, c.; PS. reg. 3, $\frac{r}{2}$; GD. reg. 2, r. Dry rocks and walls especially in the north, and in all the principal ravines, e. g. Rib. de S^{ta} Luzia, Rib. Frio, dos Cayados, &c. In P^{to} S^{to} on N. side of Pico d'Anna Ferreira. Apr.–July.—A small low bushy dwarf herb. pl., mostly 3 or 4, rarely 6 or 8 in. high, coming into fl. as *S. dumosum* is going out, hoary-greyish or often reddish and all over villous-hairy, the hairs rather long and spreading whitish more or less glutinous or glandular. St. single almost always strongly curved at the base or ascending, then erect, hard, stiff, 1–3 lines in diam., round, simple, branched corymbosely and bushy upwards, clothed with a few scattered soon-falling l. L. at first, but for a very short time, forming a flattish somewhat loose rosette, then scattered on the st. and panicle, soon falling and leaving the st. naked, hoary dull or pale gr., mostly like the whole pl. bright reddish, smaller but in shape like those of *S. divaricatum*, abruptly rhomboidal with rounded angles, 4–10 or 12 lines broad, somewhat shorter in length, subcordately and abruptly cuneate at the base, with the petiole distinct 2–12 or 15 lines long. Fl. with rather long and

slender pedic. large and numerous in proportion to the size of the pl., about ½ in. in diam., full golden-y., yet somewhat paler though certainly rather larger than in *S. dumosum*, forming a conspicuous handsome more or less corymbose leafy panicle. Pet. mostly 8, often 7 or 9, sometimes 6, lanceolate, sometimes in the first-opening fl. ovate, finely hair-pointed spreading or recurved, 2½ lines or 5 mill. long, 1–1½ line broad. Hypog. glands orange mostly somewhat distinctly bipartite or bilobed, one lobe or the other unequally 2–3- or even 4-fid, rarely simple, perhaps more clavate than palmate i. e. higher or longer than broad, yet flattened with a distinct narrow-oblong rather than wedge-shaped stalk. Stam. 12–18 much shorter than the pet. Styles and ov. mostly as many as and y. like the pet., smooth and shining.—On immersion in hot water this sp. gives out a peculiar fishy disagreeable smell a little like scalded codlin apples.

S. villosum Haw., Buch Canar. and DC. Prodr. iii. 411, is supposed to be *S.* (*Aichryson*) *radicescens* Webb Phyt. Can. i. 183. And *S. villosum* Lindl. Bot. Reg. 18. t. 1553 is *S.* (*Æonium*) *Lindleyi* Webb Phyt. Can. i. 189. t. 33.

S. villosum Ait. has never been found in the Canaries, unless the imperfectly known *S. pygmæum* Chr. Sm. (*Aichryson* WB. i. 184) may be supposed to be a starved or depauperated state of it. But a very similar and closely allied sp., intermediate between the true Mad. pl. and the Can. *S. punctatum* Chr. Sm., represents it plentifully in Gomera (*S. subvillosum* Lowe), differing *primâ facie* in its gr. merely subpubescent not hoary villous aspect. It is Bourgeau's "Pl. Can. no. 443, *Aichr. villosum* Webb, Ins. Gomera, Degollada de San Sebastian Apr. 1845," and also probably his "no. 1277, *Aichr. immaculatum* Webb MSS. Teneriffæ, Baxamar; ex itin. 2do 1855," in BH. and HH. I found it abundantly on rocky banks up the valley of S. Sebastian in Gomera, 2 or 3 miles above the town, in Febr. 1858 and Apr. 1861. It seems to have been mixed up by Webb formerly with *S. punctatum*, to which it approaches indeed very closely. In the Banksian Herb. I have also found two spec. of the Gomeran *S. subvillosum* on a sheet marked "1 Madera Fr. Masson 1776." The sheet contains 5 spec.; the three middle ones being true *S. villosum* Ait., and the 2 outer on the right and left *S. subvillosum*. Thus the latter may possibly prove to be also a Mad. pl.; though from another instance of probably similar confusion of Mad. and Can. spec. in the case of

Ranunculus cortusæfolius Willd. mentioned *supra* p. 4, it cannot be conclusively affirmed from this mixture in BH. of the two sp. on one sheet so to be. It will be better, however, under the circumstances, to subjoin the diagnosis of *S. subvillosum*:

S. herb. ann. s. hapaxanthum pusillum glanduloso-puberulum, caule tenui e basi erecto nudo deorsum glabro sursum paniculatim laxe dichotomo-ramoso; fol. rhomboideis v. spathulatis basi in petiolum cuneato-attenuatis sparsis caducis glabriusculis lucidis viridulis margine integro epunctato; fl. majusculis laxis aureis plerumque longiuscule pedicellatis; paniculæ laxæ foliosæ subpaucifloræ ramulis patentibus v. deflexis tenuibus flexuosis pedicellisque filiformibus, calycibusque bracteisque glanduloso-puberulis; cymis simplicibus laxe corymboso-paniculatis; pet. 8–10 ovato-lanceolatis sepala duplo excedentibus; squamis hypog. palmato-fimbriatis. — *Aichryson villosum* Bourg.! (non Webb) Pl. Can. no. 443 (non *Semperv. villosum* alior.) et *Aichr. immaculatum* Webb MSS. ejusd.! no. 1277 (ex itin. 2^do^) in BH. et HH.—Pl. 2–4 v. 5 poll. alta tenuis pusilla, inter *S. villosum* Ait. et *S. punctatum* C. Sm. quasi media, huic propior. Variat caule omnino ramisque deorsum foliisque omnibus glabris.—Hab. in convalle S^ti^ Sebastiani Ins. Can. Gomeræ sat. vulg.

§ 2. *Patinaria* Lowe. Herb. or suffr. bienn. or subper., nearly or quite stemless and unbranched except in fl. L. imbricate in close rosettes. Fl. y. Hypog. glands simple notched retuse or lunate.

4. S. GLANDULOSUM Ait. *Ensaião de Pasta* or *Pastinha.*

Herb. bienn. once-flowering more or less glandular-pubescent mostly viscid, stemless before fl.; l. rhomboidal-spathulate or obovate-ligulate inconspicuously or irregularly fringed with short subremote often clavate or capitate subcartilaginous *cilia*, bright gr. closely imbricate in a flat or discoidal sessile radical rosette lasting till the appearance of the single central succulent branched fl.-stem; fl. large and numerous in 2–3-cleft cymes on rather long lax spreading or declining stalks or branches forming a large thick or close subcorymbose panicle; pedic. cal. br. and floral l. glandular-pubescent; pet. 10–15 mostly 11–13 lanceolate; hypog. glands shortly spathulate or wedgeshaped retuse.—Ait. Hort. Kew. (ed. 1) ii. 148; Haw. Syn. 166; Buch 197. no. 366; DC. iii. 411. *S. glandulosum* and *S. tabulæforme* Holl in J. Bot. i. 21 (not *S. tabulæforme* Haw.). *S. patina* Lowe MSS. *olim.*—Herb. 2–3-ennial Mad. reg. 1, 2, 3, ccc; PS. reg. 1, 4, $\frac{1}{4}$; GD. reg. 1, $\frac{1}{2}$. Seacliffs and perpendicular rocks, sides of ravines, walls, &c. everywhere in Mad. especially in the north. P^to^ S^to^ sparingly, on the N. coast, at P^to^ dos Frades, and on the principal rocky peaks, P. do Facho, do Castello, de Juliana, &c. July, Aug.—Root slender long tortuous and wiry striking deep

into the crevices or fissures of bare subcolumnar walls of basalt rock on which it chiefly loves to grow. St. none or very short and conical, the whole pl. consisting of a single sessile radical flat or slightly concave orbicular disk or rosette of horizontally and regularly imbricated close-pressed l., from 3 or 4 to 12 or more in. in diam., like a plate or shallow saucer and of a bright full not at all glaucous gr. L. very closely and compactly imbricated, gradually enlarging from the centre, fleshy, very variable in degree of pubescence and viscidity, ranging from scarcely more than puberulous to velvety-pubescent, minutely downy on both sides but especially beneath, the hairs often viscid, and the edges sometimes regularly sometimes scarcely perceptibly or only here and there ciliate with distinct or subremote short white subpellucid somewhat cartilaginous mostly capitate or clavate glands or *setulæ*, mostly viscid more or less all over and not particularly at the margins; the outer spathulate-wedgeshaped, very obtuse or truncate and retuse with a small point; the inner rhomboidal-wedgeshaped or broadly ovate. When about to flower (in June), the central l. rise into a little mamilliform cup, and the pl. assumes exactly the appearance of a cup and saucer. As the low short bushy fl.-stem rises from the centre of this cup, all the l. become presently flaccid and loosely deflexed, falling off altogether as the fl. advance. The fl.-stem grows very rapidly, and within a month or six weeks from its first appearance the whole pl. dries up and perishes. It is very rarely but still occasionally soboliferous, producing one or two globose leaf-bulbs or offsets on short strings or runners from below the leaf-disk. Fl.-stem short rarely more than 6 or 8 in. high thick fleshy and with its branches pale straw or flesh-colour, the whole glandulose-pubescent almost villous. Corymb candelabriform large and bushy with numerous long spreading or declining naked side-branches, each ending in a cymose panicle. Fl. secund large and handsome, of a rather pale golden-y. in Mad., of a fuller darker y., tinged outside with red, in P^to^ S^to^. Pet. mostly 12 or 13 rarely 15, rather short 4 lines long, 1½ broad, lanceolate or ovate-lanceolate acute. Stam. in a double row about ¾ length of pet.; anth., pollen and fil. bright y. Hypog. glands y. broadly spathulate or wedgeshaped retuse rather than notched.

When the sun shines hot upon a rock or cliff covered with these pl., they fill the air with a delicious balsamic fragrance like that of ripe nectarines or peaches.

Though erroneously described originally in HK. as "frutescent," and though no authentic spec. remains to verify the reference, the more exact identification of the other Mad. and Can. sp. within the last few years almost necessitates the recognition of *S. glandulosum* Ait. in this most abundant and uni-

versal Mad. pl. It is true that Solander's restriction of his "*S. glandulosum*" to a single Mad. locality, "Paul do Mar in muris —affinis *S. canariensi*" (MS. list of Mad. pl.), is difficult to be explained: but it is still harder to suppose that he or Masson could have overlooked a pl. so common, striking and peculiar as the present sp., for which however *S. glandulosum* is the only name (except indeed the still more obscure "*paniculatum*") remaining unappropriated on his list of Mad. *Semperviva*. And although DeCandolle's very restrictive comparison of *S. ciliatum* Willd. with *S. glandulosum* (Mém. ii. sur les Crassul. p. 59) seems quite opposed to the identity of the latter (*sensu Candolleano*) with my pl., and although, again, *S. glandulosum* Haw. Rev. 65 (not Syn. 166) with "fimbriated" hypog. glands was also probably something different,—still the original sp. of Aiton was, I can doubt no longer, founded principally if not solely on the common Mad. pl. to which I have assigned it.

S. tabulæforme Haw. Suppl. 69, Rev. 63, a strictly Can. pl., has been often confused with the present, having been first set down by Haworth and then by DC. (Prodr. iii. 412) erroneously as a Mad. sp. It is however easily distinguished by the remarkably long and regular pectinate close-set fringes of the l.; and it is indeed an altogether larger pl., differing no less by its more distinct sometimes (at least in cultivation) once- or twice-branched subperennial suffrutescent st. bearing often 2 or 3 rosettes, than by its perfectly smooth l. elegantly and regularly fringed with long close-set soft white cartilaginous simple *cilia*. Though entirely omitted by Webb, it occurs in vast profusion on the N.W. coast of Tenerife along the seacliff road from Realejo to S. Juan de la Rambla, and also beyond Icod de los Viños on the road to Garrachico, with a few pl. intermixed here and there of the true Mad. *S. glandulosum*, which has equally escaped the observation of Webb and other botanists as a Canarian pl.

The principal indigenous Mad. *Semperviva* curiously correspond with several of the Can. sp. Thus the Mad. *S. divaricatum, villosum, glutinosum* and *glandulosum* represent both in habit and abundance the Can. *S. punctatum* DC., *subvillosum* Lowe, *canariense* L. and *tabulæforme* Haw., all except *S. glandulosum* being strictly confined to their respective group of islands.

§ 3. *Æonium* Webb. Shr. branched per. L. in lax terminal rosettes. Fl. y. or pale gr. Hypog. glands simple transversely oblong notched or toothed.

5. S. GLUTINOSUM Ait. *Ensaião* or *Ensayão.*

Smooth suffruticose, branches few decumbent straggling naked downwards, viscid as if varnished; l. terminal loosely aggregate spathulate or rhomboidally wedgeshaped with a short abrupt point, clammy shining, indistinctly cartilaginously ciliate; fl. in remote forked spreading cymes disposed in a terminal large loose straggling leafy panicle with long distant spreading or declining branches; pet. 8–11 mostly 9 or 10 lanceolate; hypog. scales short broad subbilobed and notched or eroso-crenulate.—Sol.! in BH.; Ait.! H. K. (ed. 1) ii. 147; Jacq. Hort. Schoenbr. iv. 32. t. 464; Haw. Syn. 165; BM. t. 1963; Buch! 197. no. 367; DC. iii. 411; Bot. Reg. t. 278; Tr. Linn. Soc. 16. pp. 396–398. *S. canariense* Sol.! in BH. *a prima manu*; Buch! 197. no. 364 (not Linn.).—Shr. per. Mad. reg. 1, 2, 3, ccc. Seacliffs and perpendicular dry rocks in ravines, &c. everywhere up to a height of 5000 feet. June–Sept.—A per. herbaceous pl. becoming shrubby, with few remote thick stout decumbent or ascending straggling reddish or chestnut-col^{d} branches 1–2 ft. long, minutely puberulous and leafy towards the ends, naked and woody downwards and especially in summer viscid as if varnished. L. smooth in loose crowded terminal tufts, $1\frac{1}{2}$–$4\frac{1}{2}$ in. long and 1–2 in. broad towards the end, broadly spathulate and rounded upwards with an abrupt short more or less recurved point, attenuated downwards, flat but thick and fleshy, bright yellowish full gr., viscid and shining but less so than the younger branches; the *cilia* at their edges short thickish and irregular or inconspicuous. Panicle from the centre of the terminal tufts of l., about a foot long, sparingly and remotely branched, with a single deciduous l. at each division, its branches extremely glutinous as if coated with fresh moist varnish, shining and brightly tinged with red or purple, at first compact, but soon becoming loose and straggling with few remote horizontal or drooping branches. Fl. orange or golden-y. Sep. as many as pet. united halfway up into a cyathiform or cup-like base, their segm. short broadly triangular or half-ovate fleshy. Pet. mostly 9 or 10 lanceolate acute 5 mill. long, 2 broad, bright y. internally, with mostly a bright red or ruddy streak at the back, which disappears on immersion in hot water. Stam. about as long as pet. Hypog. scales broader than high subbilobed with a single faint notch or minutely and irregularly toothed or crenulate.

The bruised l. and juice are esteemed efficacious in outward or internal injuries from bruises, falls, &c. But a more important use of the pl. consists in its employment by the fishermen

to harden or stiffen and at the same time strengthen and preserve their lines. For this purpose a large quantity of the pl. being collected, the bark of the stems is stripped off, and pounded small in a large rude mortar. The fishing-lines are then stretched out and rubbed well backwards and forwards for some time with handfuls of the pounded bark, and steeped afterwards in some alkaline liquid. The viscous resin has no doubt the chief efficacy in this process, acting mechanically like wax on thread. The result is the imparting of stiffness, strength and durability to the lines, which are also rendered black and shining by the operation. See Trans. of Linn. Soc. l. c.

In Lanzarote *Semp.* (*Æonium*) *balsamiferum* WB. is used by the fishermen, under the name of Alfarroba or Farroba, for the same purpose. See WB. i. 192, 193, with a note on the derivation of the word Ensayão.

This sp. has never yet been found in the Canaries. On the other hand the common Can. true *S. canariense* L. is certainly not found in Mad., though young vigorous large-leaved pl. of *S. glutinosum* Ait. before fl. have much resemblance to it in habit and general aspect. The mistake of including *S. canariense* L. in the Mad. lists originated from Solander having so named *prima manu* an undoubted Mad. spec. from Masson (Madera Fr. Masson 1776 in rupibus) of *S. glutinosum*. This indeed he or Mr. Brown afterwards corrected; erasing the words "canariense Linn." and writing "*glutinosum* MSS." over them. Still he has certainly enumerated in his MS. List of Maderan *Semperviva S. canariense* L. as well as *S. glutinosum*, which last he appears also to have once called *bituminosum* and which is perfectly identified, even in this list, by the word "Insayam" in brackets appended. He has however still one name, "*S. paniculatum*," in this list for which I am quite unable to account *, and can only suppose it (for there is no clue beside the name whatever for its exact identification) possibly to stand for the true *S. arboreum* L.; his spec. marked "*Semperv. arboreum* Linn. Sp. Pl. 664, Madera" in BH., being certainly merely a vigorous young pl. of his own *Sedum divaricatum*.

* *Semperv. dumosum* suprà would have been called a *Sedum* by Solander.

††6. S. ARBOREUM L. "*Saião*" Brot.

Smooth, not viscid, fruticose and even tree-like, with stout subumbellate erect straight very smooth and even regularly quincuncially scarred branches; l. in disk-like terminal rosettes narrow lanceolate-cuneate or acutely spathulate, elongate and much attenuated downwards, shortly and minutely but closely ciliate upwards; cymes in terminal compact close half-oval or oblong obtuse thyrsoidal heads or panicles; pet. 9–12 linear-lanceolate; hypog. glands shortly and broadly wedgeshaped notched or bilobed and minutely toothed.—Desf. i. 389; Brot. ii. 378; Spr. ii. 468; DC. Pl. Grass. t. 125 and 125*; DC. iii. 411; Bot. Reg. 2. t. 99; Haw. Syn. 164, Rev. 63; Fl. Gr. t. 473 (not Buch's Mad. List). *S. paniculatum* Sol. MS. in BH. ?—Shr. per. Mad. reg. 1, cult. or half-naturalized, r. On the tops of walls and roofs of houses here and there in Funchal, growing spontaneously, but merely as a straggler or outcast from gardens, and certainly not indig. in Mad. Apr.–June.—A small sparingly but proliferously branched erect dwarf tree-like shr., 2 or 3 ft. high, with a distinct st. and stout stiff naked very round and even upright branches as thick as the little finger, fleshy and somewhat thickened upwards, pale brown very smooth but regularly scarred quincuncially below the terminal rosettes or disks of flat and rather thin but fleshy very shining bright gr. l., which are 2–3½ in. long and only 6–8 lines broad towards their end. Fl. bright clear y. in thick close terminal oval or oblong thyrse-like bunches 6–12 in. long, at first short and pyramidal but lengthening out as the fl. expand. Branches of thyrse, pedic., br. and cal. very minutely glanduloso- or furfuraceo-puberulous. Upper l. and br. lanceolate deciduous. Sep. ovate-lanceolate. Pet. mostly 12; stam. twice as many; ov. and styles 9 or 10. Hypog. glands short truncate broadly wedgeshaped notched or bilobed, the lobes very minutely croso-denticulate.

A spec. in BH., marked "*Semperv. arboreum* Linn. Sp. Pl. 664 Madera," collected by Banks and Solander, is assuredly not *S. arboreum* L., but a vigorous young pl., first beginning to branch before flowering, of *S. divaricatum* (Ait.). This was however doubtless the sole original authority for *S. arboreum* of both Solander's and Buch's Mad. Lists.

Though unrecorded as indigenous in the Phytogr. Can., and merely referred to by Webb as a northern precursor of the Macaronesian sp. (WB. i. 185), I have met with *Semp. arboreum* L. abundantly and apparently quite wild in two or three islands of the Can. Archipelago: viz. Tenerife up the Barranco de Martianez about a mile above the Montaña del Orco near Orotava,

in vast profusion on the wild rocky cliffs of the ravine; in Lanzarote in beds of *Opuntia Tuna* L. at a village called El Valle on the middle road from Arecife to Aria at least perfectly naturalized; and again, as I believe, in Hierro, and beyond all doubt quite wild, on the lofty wooded cliffs up the road called Las Vueltas above La Casa Blanca in El Golfo, though I have not entirely assured myself of the identity of the Hierran pl. with those from Tenerife and Lanzarote.

Order XL. SAXIFRAGACEÆ.

The Saxifrage Family.

Fl. mostly perfect regular. Cal. 4–5-cleft inferior or superior persistent imbricate in bud. Pet. 4–5 very rarely 0. Stam. 4 or 5–8 or 10 free perigynous or hypogynous. Ovary of 2 coherent many-ovulate carpels. Styles 2 (rarely 3–5) persistent. Fr. a 2–1-celled many-seeded capsule, bursting at the inner suture. Embryo axile with fleshy albumen.—Shr. or herbs mostly per. and alpine with w., p. or y. (rarely b.) scentless fl., rarely shr. or tr. L. without stip. alternate or opposite.

Tribe I. *HYDRANGEÆ.*

The Hydrangea Tribe.

Shr. with opposite simple undivided l. Fl. 5-pet. 10-androus 2–5-styled corymbose, the outer and sometimes nearly all often sterile or abortive with enlarged coloured petal-like cal.-teeth or sep. Fr. a 2–5-celled caps. or berry.

1. HYDRANGEA. Fl. mostly of two kinds, fertile and abortive. Cal.-tube semiglobose 10-ribbed subtruncate adnate to the ov., limb 5-toothed persistent. Pet. regular. Styles 2. Caps. 2-celled with inflexed valves, many-seeded. Seeds reticulate.—Barren fl. with cal.-teeth large dilated and coloured or petal-like, the true pet. and other parts remaining abortive.

Tribe II. *SAXIFRAGEÆ.*

The Saxifrage Tribe.

Herbs mostly alpine with alternate very rarely opposite lobed or divided l. Fl. 5-pet. 10-androus 2-styled racemose or panicled rarely single, all fertile. Fr. a 2-carpelled caps.

2. Saxifraga. Cal. 5-fid or 5-partite more or less united to the ov. or free. Pet. 5. Stam. 10 rarely 5. Caps. 2-celled 2-beaked opening by a pore between the beaks.—Herbs per. or ann. Fl. corymbose.

Tribe I. *Hydrangeæ.*

1. Hydrangea L.

†††1. H. hortensis Sm.

L. ovate or oval acute serrulate and with the branches wholly smooth and shining; corymbs large globose; abortive fl. very numerous crowded, with the enlarged cal.-lobes rounded and quite entire; fertile very few 2–3-styled.—Smith Ic. Pict. i. t. 12; *H. Hortensia* DC. iv. 15. *Hortensia opuloides* Lam. Enc. iii. 136. *H. speciosa* Pers. Syn. 505. *Primula mutabilis* Lour. Coch. i. 127. *Viburnum serratum* aut *V. tomentosum* Thunb. ?—Shr. per. Mad. reg. 2, cult. cc. The Mount, Camaxa, S^{to} Ant^{o} da Serra, Maxico, P^{to} da Cruz, S^{ta} Anna, S. Vicente, &c., common as a fence about houses and gardens, above 1000 ft. July–Oct.—A low shr. branched from the base 2–4 or 5 ft. high wholly smooth with stiff straight thickish hollow or pithy branches and habit altogether of a *Viburnum*. L. 3–5 in. long, 2–4 broad, coarsely ribbed dark or full gr. very shining deciduous. Fl. in vast globose crowded heads, of a peculiar copperas-blue, very rarely in Mad. pink or rose. At a distance large masses of the pl. in fl. seen near the ridge of a mountain-slope look like gaps or holes through the hill-side with the blue sky beyond. The almost constant blue of the fl. in Mad. is doubtless attributable to the prevalence of iron-oxide in the soil.

Almost every one at first sight, deceived like Thunberg by its resemblance to *Viburnum* and especially to *V. Opulus* L. *β. sterilis* (the common Snowball-tr. or Guelder-rose), would refer *Hortensia* to Caprifoliaceæ rather than to Saxifragaceæ. Yet is the resemblance to the former more apparent than real: for the sterile radiant fl. of *Hydrangea hortensis* owe their size and beauty to the monstrous enlargement of the cal.-lobes or sep., whilst in *V. Opulus β.* the same effect is produced by development of the pet. And the difference from the latter is one at most of habit and foliage,—owing in great measure to partial or confined ideas of Saxifragaceæ from acquaintance only with the European normal type *Saxifraga*,—whilst the fl. and fr. are essentially Saxifragaceous.

Tribe II. *Saxifrageæ.*

2. Saxifraga L.

Sect. *Dactyloides* Tausch. Per. with decumbent barren shoots; fl. panicled, fl.-st. leafy, sep. erect or spreading, superior.

1. S. maderensis Don.

Cespitose rigid viscid all over as if varnished; st. short suffrutescent ascending or decumbent densely leafy; l. crowded on long stalks, the lower reniformly subquinato-palmatifid, the lobes subtrifid, teeth acute half-ovate or triangular; upper l. trifid or entire and lanceolate; fl.-st. short leafy mostly glandular-pubescent upwards, about 5-fld.; sep. half-inferior ovate or ovate-lanceolate acute: pet. oblong-spathulate 2–3 times as long as sep.—Don "in Tr. Linn. Soc. xiii. 114"; Spr. ii. 371; DC. iv. 30. *S. geranioides* Buch 197. no. 362 (not Linn., Host, &c.).—Herb. per. Mad. reg. 3, 4, ½; PS. reg. 4, r. Craggy rocks all along the Caminho central from the Primeira Vista do Curral to the Encumeada; Curral das Freiras on both sides; Rib. de S^{ta} Luzia near the Waterfall and in all the principal Ravines in the north of the Island; at P^{ta} do Pargo on a bank below the Church, &c. In PS. on the craggy top of Pico do Facho, P. do Castello, &c. Apr.–June.—Forming usually large thick beds or spreading tufts, rarely solitary, very stiff and glutinous in almost all its parts, as if varnished, like *Semperv. glutinosum* Ait. and with a resinous fragrance like the buds of the Horse Chestnut (*Æsculus Hippocastanum* L.) in early spring. The whole pl., as Haller says of *Ger. lucidum* L., "amat rubescere"; the petioles, fl.-st., edges of l. and often their whole surface turning at least in withering bright red. St. 2–4 in. long almost shr. downwards hard and stiff thickly clothed with old dried l. or petioles. L. crowded upwards dark full gr. quite smooth but clammy, somewhat fleshy, stiff or brittle, roundedly or subreniformly palmatifid more or less cuneate ½–1 in. broad or long, 4–9 lines long or broad, faintly 3-nerved, coarsely and unequally cut into 5–19 (mostly about 14) acute teeth in sets of 3 or 5, the middle set always 3-toothed, the 2 side lobes often 2-toothed. Petioles 1–1½ in. long flattened dilated at their base and sometimes slightly fringed or puberulous, smooth upwards and often so altogether, though always very clammy. Fl.-st. slender about 2 in. high red shining varnished and clammy smooth below, upwards with the ped. more or less glandular-pubescent, bearing at top a loose subcorymbose panicle of 3–7 (mostly about 5, rarely 1 or 2) conspicuous pure w. fl. St.-l. rather distant, the upper simple lanceolate or linear. Fl. large and elegant, in size and aspect much like those of *S. granulata* L. Cal. united to the ov. halfway up, less pubescent than the pedic. and upper part of fl.-st., sometimes quite smooth always viscid, sep. short

(1½ line long) in fl., rather longer in fr., a little shorter than the cal.-tube, fleshy stiff erecto-patent nearly or quite smooth. Pet. inserted at the top of cal.-tube pure w. with 3 faint gr. nerves at base, oval or slightly obovate-oblong or spathulate, 2–3 times the length of sep., 3–4 lines long, 2 lines broad. Styles divaricate nearly smooth; stigmas clavate downy. Caps. globosely half-ovate. Seeds extremely minute ellipsoidal mucronulate at one end, dark reddish-brown roughly granulate.

Saxifraga granulata L. was reported to the late Dr. C. Lemann by his sister to have been once observed by her on rocks by the road (Caminho central) along the brink of the Curral between the Jardim and Pico Grande, close to the remains of the first of the houses of refuge formerly built for travellers in remote and dangerous passes of the mountains by the late Robert Page, Esq. I have repeatedly searched (as Dr. Lemann had before me) in vain on and about the spot for the pl. in question; and I cannot doubt, which was also Dr. Lemann's own conviction, that either some detached pl. of *S. maderensis*, or possibly of *Arabis albida* Stev., or *Cerastium vagans* Lowe, had been mistaken for it, all three being found plentifully at or about the place.

Order XLI. UMBELLACEÆ.

Fl. umbellate mostly regular and perfect. Cal. adherent to ov. 5-toothed or entire, the teeth rim or border often obsolete. Pet. 5 inserted at top of cal.-tube *imbricate* or *involute in bud* and notched with an inflexed middle lobe or point, the outer sometimes enlarged and radiant. Stam. 5 free alternate and inserted with the pet., incurved in bud. Ov. inferior adnate to the cal.-tube, 2-celled, cells each 1-ovulate. Styles 2 persistent more or less thickened at the base into a fleshy cone or disk (stylopod). Fr. dry of 2 one-seeded indehiscent carpels (*mericarps*) coated by the cal. and adhering by their inner face (*commissure*) to a bifid or bipartite axis (*carpophore*) from the base of which they finally separate upwards remaining suspended or pendulous from its top. Seed single pendulous adnate to the pericarp rarely free consisting almost entirely of albumen. Embryo minute at top of the large horny alb.—Herb. or suffr. resinously aromatic pl. with alternate l. dilated and sheathing at their base and mostly more or less decompoundly pinnatipartite. Fl. in twice-compound umbels (with or without general and partial bracts or involucres) small, mostly w., rarely y. p. or purplish. Styles and carpels one outside the other with respect to the centre of each partial or secondary umbel. Fr. aromatic; carpels each with 5 stronger (*primary*) ribs and often 4 intermediate (*secondary*) ribs or striæ, having longitudinal linear

resin-glands (*vittæ*) imbedded in the substance of the pericarp or on the surface of the seed alternating mostly with the primary ribs and on the commissure.

Suborder I. ORTHOSPERMÆ.

Seed (albumen) flat or convex (not grooved) on the inner (commissural) side or face. (Umbels compound or perfect in all the Mad. sp.)

§. *Fr. with primary ribs only* (except in *Œnanthe*). Ribs of each carpel (*mericarp*) 5, 3 dorsal, 2 lateral or marginal.

Tribe I. *AMMINEÆ.*

The Parsley Tribe.

Fr. *laterally compressed* or *didymous*, the transverse section oval-oblong or 8-shaped.

1. Apium. Cal.-rim obsolete. Pet. roundish entire with a *short* simple inflexed lobe or point. Stylopod *flattened depressed*. Fr. roundish-ovoidal didymous; ribs filiform equal, the dorsal with single alternating vittæ, the lateral with 2 or 3. Carpophore *entire*.—Inv. general and partial 0.

2. Petroselinum. Cal.-rim obsolete. Pet. roundish incurved nearly entire with a *narrow produced* involute point. Stylopod *tumid conico-convex lobed or crenate*. Fr. ovoidal subdidymous; ribs filiform equal with single alternating vittæ. Carpoph. free *bipartite*.—Inv. general few-, partial many-leaved.

3. Helosciadium. Cal.-rim minutely 5-toothed or obsolete. Pet. ovate acute entire with *the tip simple straight* or scarcely incurved. Stylopod pulvinate *flattened lobed*. Fr. ovoid or oblong; ribs filiform *prominent* equal with single alternating vittæ. Carpoph. free entire.

4. Ammi. Cal.-rim obsolete. Pet. *obovate irregular unequally 2-lobed* with a strongly inflexed and notched or 2-toothed point. Stylopod pulvinate convex entire. Fr. ovoid-oblong, ribs filiform with single alternating vittæ. Carpoph. free *bipartite*.

5. Bunium. Cal.-rim obsolete. Pet. *obcordate* with *a somewhat large or produced* inflexed lobe. Stylopod *conic or pulvinate*. Fr. oblong; ribs filiform with 1–3 alternating vittæ. Carpoph. free *bifid at top*.

6. Bupleurum. Cal.-rim obsolete. Pet. *roundish entire* with *a strongly involute* broad retuse lobe. Stylopod *de-*

pressed broad flat dilated. Fr. subdidymous compressed; ribs winged or sharply filiform or obsolete with or without 1–3 alternating vittæ. Carpoph. free bipartite.—L. *simple.* Fl. y.

Tribe II. *SESELINEÆ.*

The Fennel Tribe.

Fr. *round* or *roundish,* its transverse section more or less circular or o-like.

7. ŒNANTHE. Cal.-rim 5-toothed enlarged in fr. Pet. *obcordate* with an inflexed *narrow lobe.* Stylopod tumid. Fr. *ovoid-oblong or ellipsoidal* crowned with the *erect elongated styles*; carp. *spongy or corky* towards the commissure or suture, ribs simple rounded or obtuse, 3 dorsal, the 2 lateral remote; *with* 4 *secondary intermediate striæ* and single alternating vittæ. Carpoph. *indistinct.*

8. FŒNICULUM. Cal.-rim tumid *obsolete.* Pet. *roundish entire involute* with a *broad squarish* retuse inflexed lobe. Stylopod conic or globose. Fr. cylindric-oblong or ovoidal crowned with the *very short erect styles,* its transverse section somewhat circular or broadly oval; ribs *equal prominent sharp* simple with single alternating dorsal vittæ but *without intermediate striæ.* Carpoph. *bipartite.*—L. finely decompound. Fl. y. Inv. o.

9. CRITHMUM. Cal.-rim obsolete. Pet. entire roundish-ovate or elliptic involute with a *ligulate lacinula.* Stylopod conic. Fr. *oblong-ovoidal or elliptic* rounded *fungose or spongy*; ribs sharp prominent scarcely winged, the 2 lateral or marginal strongest or broadest. Carpoph. *obsolete.* Seed *free loose many-vittate.*—L. fleshy.

Tribe III. *PEUCEDANEÆ.*

Fr. much compressed or flattened dorsally, *winged all round on each side* at the margin, wing single.

10. IMPERATORIA. Cal.-rim obsolete. Pet. obovate or obcordate with an involute lacinula. Stylopod conic. Fr. broadly or roundly oval, with a thin broad dilated simple wing or border; ribs equidistant, 3 dorsal filiform, 2 lateral more obsolete each at base of wing, with single alternating vittæ. Carpoph. free bipartite.—Said to differ from *Peucedanum* only in the obsolete i. e. very obsoletely 5-toothed cal.-rim.

§§. *Fr. with both primary and secondary ribs.*

Tribe IV. *SILERINEÆ.*

Fr. more or less lenticularly compressed dorsally, *not winged*; ribs all apterous, the secondary sometimes obsolete.

11. KRUBERA. Cal.-rim 5-toothed. Pet. roundish-obovate or obcordate notched with an inflexed point. Stylopod large and tumid. Fr. elliptic-oval thickish; primary ribs thick obtuse strongly cancellated and crenately plicate on their sides, the 2 lateral broader tumid; secondary 0. Vittæ 0. Carpoph. bifid.

Tribe V. *THAPSIEÆ.*

Fr. compressed and flattened dorsally, or sometimes roundish; 3 dorsal primary ribs *simple*, 2 lateral hidden on the commissural face; secondary 4, *the* 2 *outer or all* 4 *winged or dilated.*

12. MELANOSELINUM. Cal.-rim *minutely or indistinctly* 5-*toothed.* Pet. roundish-obovate distinctly clawed with an inflexed acuminate lacinula. Stylopod large tumid depresso-pulvinate. Fr. oblong *flat winged, primary ribs filiform*, 3 dorsal, 2 commissural; secondary 4, 2 dorsal *filiform obsolete*, 2 lateral marginal *membranous-winged* (wing toothed or serrulate). Vittæ beneath all the ribs. Carpoph. bipartite.—St. simple cylindric woody hapaxanthous. L. in a large terminal umbraculate crown tripinnatisect with large leafy segments. Umbel-panicle large central.

13. MONIZIA. Cal.-rim *distinctly* 5-*toothed.* Pet. distinctly fringed and pubescent elliptic-oblong entire with an inflexed ligulate lacinula. Stylopod large tumid depresso-pulvinate. Fr. elliptic-oblong flattened many-ribbed *with a tumid dilated corky rim or border*; ribs all (except the commissural) *thickened obtuse corky or spongy*; primary, 3 dorsal and 2 commissural on each mericarp; secondary, 2 dorsal and 2 lateral marginal, the 2 latter *very large thick tumid and obtuse.* Vittæ 2 dorsal and 2 lateral beneath the secondary ribs and 2 very broad commissural. Carpoph. bipartite. Seed flattened.—Stemless or shortly and thickly caudescent suffruticose per. pl. with a large terminal crown of finely decompound fern-like smooth and shining foliage and branched central umbel-panicle.

Tribe VI. *DAUCINEÆ.*

Fr. more or less *compressed dorsally*; 3 dorsal *primary ribs obsolete* filiform *shortly setulose*, 2 lateral hidden on the com-

missural face; 4 secondary stronger more prominent *prickly-winged or ciliate-setose in a single row.*

14. DAUCUS. Cal. 5-toothed. Pet. obovate notched with an inflexed acute lacinula, the outer often radiant unequally bifid. Stylopod tumid depresso-pulvinate. Fr. ovate oval or oblong; 3 primary dorsal ribs filiform setulose, secondary (4) more prominent equal with a single row of prickles or bristles more or less connate at the base into a wing and a single *vitta* beneath each. Carpoph. free entire bifid or bipartite.—Herbs mostly bienn. with decompound finely divided l. and mostly a large fleshy blackish-purple sterile centre-fl. or abortive partial umbel in the middle of the main umbel. Rays of umbel numerous mostly incurved in fr. Inv. gen. and partial many pinnatifid.

SUBORDER II. CAMPYLOSPERMÆ.

Seed (albumen) longitudinally grooved or furrowed on the inner (commissural) face, with the margins laterally involute or inflexed.—Umbels compound or perfect.

Tribe VII. *CAUCALINEÆ.*

Fr. *laterally subcompressed or roundish* many-ribbed *armed*; 5 primary ribs filiform setose or prickly, 3 dorsal, 2 lateral on the commissural face; 4 secondary more prominent setose and prickly or effaced by prickles covering the grooves (*valleculæ*) between the primary ribs. Vittæ 1 beneath each secondary rib and 2 commissural.—Fl. w. or p.

15. TORILIS. Cal.-rim 5-toothed. Pet. obovate notched with an inflexed notched or retuse lacinula, the outer often radiant bifid. Stylopod tumid depresso-pulvinate. Fr. laterally subcompressed, all over prickly-setose; 5 primary ribs setose, 4 secondary indistinct hidden or effaced by the thickly crowded prickles of the interstices of the primary, with a single vitta beneath each. Carpoph. setaceous free bifid.—Herbs more or less subscabrous; hairs on st. reflexed, on umbels erect. Fl. w. or reddish, of the disk abortive capitate.

Tribe VIII. *SCANDICINEÆ.*

Fr. *laterally compressed* elongate often beaked, *unarmed*; primary ribs equal filiform sometimes obsolete, *secondary* 0.

16. SCANDIX. Cal.-rim obsolete. Pet. obovate truncate or notched with an inflexed point. Stylopod very large and prominent with a raised frill-like rim or border. Fr. linear-oblong with a long beak; primary ribs obsolete equal ob-

tuse. Vittæ 0 or obsolete. Carpoph. free entire or bifid only at top.—Ann. herbs with finely decompound capillary-multifid l., few-rayed umbels and w. fl. General inv. 0 or 1-leafed.

Suborder III. CŒLOSPERMÆ.

Seed (albumen) hemispherically concave or hollow like a bowl on the inner commissural face, the margins incurved both vertically and laterally and both the vertical and transverse sections crescent-shaped.

Tribe IX. *CORIANDREÆ.*

Fr. globose or didymous; primary ribs depressed or obsolete, 4 secondary more prominent; all apterous unarmed.

17. Coriandrum. Cal.-rim unequally 5-toothed, teeth persistent very distinct leafy and enlarged in fr. Pet. obovate notched or obcordate with an inflexed point, the outer radiant bifid. Stylopod conic. Fr. globose scarcely splitting or dividing; primary ribs flexuose obsolete, the 2 lateral each at the base of the riblike accessory edge or border; 4 secondary simple filiform sharply prominent or keeled. Dorsal vittæ 0, commissural 2. Carpoph. entire splitting only in the middle. Commissural face of alb. or seed circularly concave, covered with a loose free membrane.—Inv. 0.

Suborder I. ORTHOSPERMÆ.

Tribe I. *Ammineæ.*

1. Apium L.

1. A. graveolens L. **Celery.** *Aipo.*

Smooth and shining; l. subternately pinnate or pinnatisect; lfts. of the lower l. large inciso-ternate stalked rhomboidally and broadly or ovately wedgeshaped inciso-toothed at top, of the uppermost small ternate sessile lanceolate trifid or entire.—Desf. i. 266; Brot. i. 463; EB. t. 1210; Sm. E. Fl. ii. 76; DC. iv. 101; WB. ii. 150; Koch 311; Bab. 140; RFG. t. 1854. f. ii.—Herb. ann. or bienn. Mad. reg. 1, chiefly, but also 2, 3, c. PS. reg. 2, c. Seacliffs mostly in Mad. almost everywhere, but also occasionally far up the principal Ravines, as the Curral dos Romeiros, Rib. de S^{ta} Luzia, &c., and in the North, Rib. de S. Jorge, &c. In the Serra de fora, PS., abund. May–Aug.—Root shortly fusiform not thickened but hard and woody at the crown. St.

erect stiff straight 1½–2 ft. high sparingly stragglingly and divaricately branched, angular strongly ribbed or furrowed fistulose, often red or purple downwards like the l.-stalks. Foliage dark shining gr.; lfts. of lower l. an inch or more long or broad, of uppermost ¼–½ in. long, 1–2 lines broad. Umbels lateral and terminal numerous small inconspicuous very shortly stalked or sessile with a ternate or 3-partite l. or two at their base, very unequally 4–12-rayed, not confluent and without either general or partial inv. Partial umbels remote distinct small. Fl. minute and inconspicuous dull greenish-w. Stam. scarcely longer than the pet. Styles short divergently recurved, not longer than the depressed stylopod.

The use of this pl. as an esculent is confined to a very few gardens in Mad., chiefly at Camacha or the Mount. By the country people it is entirely neglected.

2. Petroselinum Hoffm.

1. P. sativum Hoffm. **Parsley.** *Salsa.*

Smooth and shining; st. erect branched; l. 2–3-pinnate, lfts of the lower l. inciso-ternate stalked rhomboidal or broadly wedge-shaped with toothed obtuse subtruncate lobes, of the uppermost linear-lanceolate entire; umbels many-rayed, rays subequal spreading; styles recurved longer than the stylopod.—DC. iv. 102; Seub. Fl. Az. 42; Koch 311; Bab. 140. *Apium Petroselinum* L., Desf. i. 265; Brot. i. 463; EBS. t. 2793.—Herb. ann. or bienn. Mad. reg. 1, 2, c. PS. reg. 2, c. Rocks and cliffs in ravines or by the sea almost everywhere, Rib. de S^{ta} Luzia, &c. PS. in the Serra de fora, &c. May–July.—Root whitish strong thick long tapshaped or fusiform. St. stout erect stiff hard round striate 12–18 in. rarely 2–3 ft. high mostly somewhat low and straggling, much branched, full bright gr. never reddish. Foliage bright gr., lfts of lower l. ½ in. long or broad, of uppermost 1 in. long, 1 line broad. Umbels terminal moderately large distinctly stalked, not very unequally 10–20-rayed, not confluent, with 1–3 general and 5–10 partial linear involucels. Partial umbels separate distinct. Fl. small inconspicuous greenish-y. Stam. considerably longer than the pet. which are very small and strongly incurved. Styles moderately long, divergently recurved, longer than the raised tumid stylopod. Fr. compressedly ovoidal dark brown with distinct pale ribs. *Vittæ* 6 subequidistant, 4 dorsal, 2 commissural.

Of the same universal use in cookery in Mad. amongst all classes as elsewhere. The curled or crisped-leaved var. β. DC. is also occasionally cult.

3. Helosciadium Koch.

1. H. nodiflorum (L.). *Rabaça.*

St. procumbent rooting at the base; l. pinnate, lfts. ovate or ovate-lanceolate equably serrulate; umbels opposite to the l. nearly sessile or longer than their ped. which is much shorter than either their rays or the opposite petiole; gen. inv. 0 or 1–2-leaved deciduous.—DC. iv. 104 (excl. varr. β, γ); WB. ii. 149; Koch 312; Bab. 141 (excl. var. β). *Sium nodiflorum* L.; Buch 195. no. 295; EB. t. 639; Sm. E. Fl. ii. 57. *Sison nodiflorum* Brot. i. 423. *Apium nodiflorum* RFG. t. 1846.—Herb. per. Mad. reg. 1, 2, 3, ccc. Edges of streams and watercourses almost everywhere; Levada de S^{ta} Luzia, Rib. dos Cayados, de Machico, at Porto da Cruz, S^{ta} Anna, S. Vicente, Magdalena, &c. May-July; but at most seasons. —Very variable in size and luxuriance with succulent fistulose st. from 2 or 3 in. to 2 ft. in length forming large beds or patches and rooting only at the lowest joints, the ends ascending. Branches remote forked straggling. Whole pl. smooth of a bright shining gr. All but the uppermost l. with long petioles. Lfts. opposite sessile rather large about an in. long, those of the lower l. occasionally lobed. Fl. minute inconspicuous dull greenish-w. in small shortly stalked inconspicuous not confluent lateral umbels of 5–8 unequal rough and angular primary rays (which are $\frac{1}{4}$–$\frac{1}{2}$ in. long) and considerably more numerous secondary forming little separate remote heads. Partial inv. persistent about 6 rather broadly lanceolate leaflike and conspicuous with broad membranous whitish margins. Gen. inv. very rarely present in Mad. and then of one leaf shaped like the partial. Styles short but twice as long as stylopod. Fr. small broadly ovoidal short.

The l. and st. are eaten occasionally by the country people like water-cresses.

The nearly allied true *H. repens* (L. fil.) Koch 312, RFG. t. 1845. f. iii, distinguished by its rounded lfts, umbels with ped. longer than their rays and 3–5-leaved persistent gen. inv., has not occurred in Mad., nor have I ever observed the var. *H. nodiflorum* β. *ochreatum* DC. l. c., *intermedium* Coss. et Germ. Fl. (ed. i.) i. 208, said to be "exactly intermediate between *H. nodiflorum* and *repens*," with "slender prostrate rooting st., umbels more or less stalked, with their ped. sometimes longer than the rays and gen. inv. 0 or 1–2-leaved," though found, according to Seub. Fl. Az. 42, in Terceira one of the Açores.

4. AMMI L.

1. A. MAJUS L. *Salsa de Burro,* PS.

Glaucous; st. *low flexuose repeatedly fork-branched from the base,* branches *straggling widely divaricate spreading*; l. mostly heterophyllous, lower or root-l. pinnate or subbipinnate with leaflike simple oblong-obovate or spathulate sharply finely and evenly cartilaginously mucronate and serrulate lfts.; upper l. always decompound or finely multifid 2–3-pinnatisect with flat narrow-lanceolate or linear-lanceolate regularly serrate or entire segments, each ultimate tooth or segm. ending in a fine cartilaginous awn or point; umbels opposite the l. moderately stalked 10–30-*rayed,* the rays (gen. and partial) *finely scabrous* spreading, erect or subincurved in fr.; gen. inv. several *distinctly shorter than the rays,* mostly about half as long, setaceo-pinnatifid or trifid, partial numerous simple linear with membranous margins and produced into fine setaceous awn-like points.—Herb. ann., Mad., PS., GD. reg. 1, 2. Apr.–Aug.—From 6 to 18 in. rarely 2 ft. high stragglingly branched throughout, but though low neither bushy nor with a distinct erect straight main stem developed at the expense of the shortened or partially suppressed side branches. Whole pl. altogether smooth and more or less (especially the broad undivided lower lfts. in *α.* and *γ.*) glaucous, almost or quite scentless and tasteless. St. branched flexuose or zigzagged from the base, regularly and widely forked, pale and whitish with narrow gr. lines or striæ downwards, slender but hard and stiff, round smooth and even or only angular and faintly ribbed upwards. Lfts. of the root and lower st.-l. mostly but not always undivided and leaf-like, and then somewhat stiff and coriaceous shining 2–4 times as long as broad finely and closely cartilagineo-serrate; of the upper l. gradually narrower and more lanceolate with the margins either gashed and regularly serrate or entire: but sometimes all the l. are finely decompound and 2–3-pinnatisect with narrow linear-lanceolate segments which are either serrate or entire.—Umbels confluent of moderate size or rather small, their stalks 2–3″ in. long round striate smooth and even, with from 8 or 10 to 20 or 30 equal slender minutely subscabrous rays spreading in fl., suberect in fr.; partial rays very numerous unequal scabrous especially upwards, spreading in fl., suberect in fr. Fl. rather large pure w. all fertile with large pet.; ovary subpuberulously scabrous; styles divergent a little longer than the distinct convex presently conical conspicuous stylopod, deflexed in fr. Gen. inv. about 6 short, never exceeding $\frac{1}{2}$ or $\frac{2}{3}$ the length of the rays, simple or compound with fine almost setaceous divisions, and either trifidly pinnate or ending in a trifid segment, each segm. finely cartilagineo-cuspidate; the whole quite smooth and even. Involucels simple and subscabrous numerous linear-lanceolate with broad

w. membranous margins, and produced into fine w. awn-like points, longer than or equalling the rays. Fr. small 1½–2 millim. long, shortly oblong or oval erect smooth strongly angular with conspicuous prominent sharp pale ribs. Vittæ 6, 4 dorsal equidistant, 2 commissural subapproximate. Varr. or rather transitory forms:

α. *heterophylla*; *root and lower st.-l.* pinnate or bipinnate with broad leaflike simple lfts., upper l. 2-pinnatisect or multifid with lanceolate or linear *gashed or serrate* lfts.—*A. majus* Linn. Sp. 349 (not Herb. Linn.!); Gouan! Bertoloni! Kotschy! Bourgeau! Bromfield! in HK.; Sloane! Herb. in BH. vol. 9. p. 16; 83. p. 138 (from Plukenet); 84. p. 16 (do.); 85. p. 23 (do.); 167. p. 317; Vill. Dauph. ii. 591; Desf. i. 245; Brot. i. 143; Buch 195. no. 291; DC. iv. 112 (excl. forsan syn. Sibth. Fl. Gr.); WB. ii. 149; RFG. t. 1864. *A. vulgare* Ger. 881. f. 1.—Mad., PS., reg. 1, 2, ccc; GD. reg. 2, ½. Cornfields and waste ground, roadsides, &c. everywhere especially about Funchal to the E. (Caniço road) and W. (Loo-fields, Praia, &c.). Apr.–Aug.—From 6 to 18 in. high. Lfts. of lower l. very glaucous round or roundish obovate or oval closely and sharply serrulate with w. sphacelate or cartilaginous fine teeth. Upper lfts. gradually more and more narrowly lanceolate and either gashed or deeply serrate. Umbel 20–30-rayed.

This, especially in the form with more finely multifid upper l., is no doubt the pl. mainly at least intended by Linnæus in his Sp. Pl., though the original spec. in his Herb. (marked "1. majus") is something altogether different (in habit more resembling *Petroselinum sativum* Hoffm. than this or any other *Ammi* with which I am acquainted), and although he has pinned to this pseudotype a spec. from the Upsal Garden (marked by him originally "*Ammi perenne* HU." with the word "*perenne*" erased and "*majus*" written over it), which, from its finely decompound l. with fine linear segm., many- (35–42-) rayed umbels and long conspicuous gen. invol. longer or as long as the very slightly scabrous rays, is rather possibly an upper portion of my *A. procerum*. Indeed but for the improbability that so fine a sp., if it existed really on the continent of Europe, could have been overlooked by more recent botanists, I should be tempted to refer to *A. procerum* several of the older synonyms quoted by Linn. for his *A. majus*,—a name which I once thought might have been intended specially to indicate *A. procerum*, but which on investigation seems to have been merely taken up by him

from Bauh. Pin. 159, where it stands in contrast with an "*Ammi parvum foliis fœniculi*" (=*Sison Ammi* L.) and where it clearly seems to designate the following var. of *A. majus*, viz.

β. *isophylla*; *all the l.* 2–3-pinnatisect with linear-lanceolate or linear *gashed or serrate lfts.*—*A. majus foliis plurimum incisis et nonnihil crispis* C. Bauh. Pin. 159. *A. majus* var. A. Desf. l. c. *A. majus* var. *tenuifolia* &c. Brot. l. c. 444. *A. intermedium* DC. iv. 113 ?—Mad. reg. 1, 2, ½. Occasionally here and there with α, into which it gradually passes. Equally spreadingly branched and with quite the habit of α, but mostly perhaps somewhat larger and from 1 to 2 ft. high, having the lower st.- or root-l. decompound with their segm. finely linear-lanceolate and serrate like the upper.

γ. *tenuifolia*; root and lower st.-l. as in α, upper 2–3-pinnatisect with linear-lanceolate or linear *nearly or quite entire lfts.*—Mad. reg. 1, ½. P^ta^ de S. Lourenço, on the dry exposed rocky sunny slope of the Penedo do Saco.—This seems to differ from *A. glaucifolium* L. (Vill. Dauph. ii. 592; DC. iv. 112; Guss. Fl. Sic. i. 317) described as having the lower as well as upper l. (as in β.) decompound or 2-pinnatisect with the lfts. linear-lanceolate or linear but very *entire* or only 1–2-*toothed* instead of regularly serrate,—merely as α. does from β. in the simply pinnate or 2-pinnate root-l. with broad leaflike lfts. It is altogether a more dwarfish slender pl. of humbler more straggling growth than α. or β, with the umbels about 10-rayed, the gen. invol. scarcely half the length of the rays and the fine linear entire segm. of the upper l. ending in a pale w. awn or point or sometimes in 2, 3 or 5 bristle-pointed teeth. It is evidently a mere depauperated state of α, grown in a maritime hot dry sunny spot.

2. A. PROCERUM Lowe.

Subglaucous or greyish; st. round *tall straight stout erect virgate* branched *upwards only* and mostly above the middle, branches *erect little developed and subordinate to the distinct main st. throughout*; l. heterophyllous, lower st.-l. pinnate or 2-pinnate with long petioles and leaflike simple roundish-oval, broadly obovate, oblong-obovate, or cuneato-lanceolate, sharply finely and evenly cartilaginously serrulate lfts.; upper l. finely decompound 2–3- or even 4-pinnatisect sessile on the sheaths of the petioles, with flat linear or linear-lanceolate partly entire partly gash-toothed or serrate lfts., each ultimate tooth or segment cuspidately awned; umbels opposite the l. on long stalks 30–50-*rayed*, the rays (gen. and partial) scabrous spreading, the former erect, latter subincurved in fr.; gen. inv. several *conspicuous nearly or quite as long as the rays*, setaceo-pinnatifid or trifid, partial simple linear with w. membranous margins and produced into fine se-

taceous hair-like points much longer than the rays.—Herb. ann. Mad. reg. 1, r. In cornfields to the E. of Funchal, S. Gonçalo 1856, Sr J. M. Moniz. May, June.—At once distinguished from the former common sp. by its altogether vastly larger size, tall erect habit with a distinct erect stout main stem developed at the expense of the side branches as in *Imperatoria Ostruthium* L. or *Conium maculatum* L. Whole pl. smooth, greyish rather than glaucous. St. 3–5 ft. high robust hard firm filled with pith 3–5 lines in diam. or as thick as the little finger, round smooth or faintly striated, not branched below ½ or ⅔ of its whole length downwards. Lower l. 12–18 in. long of which the petiole is ½ or ⅔ds, with large lfts. 1–2½ in. long and proportionately broad, pale- rather than glaucous-gr. The middle st.-l. pass by irregular intermediate gradations as to the size and shape of the lfts. into the upper which are finely decompound and sessile at the top of the sheaths of the shortened petioles. Every variety of decomposition is found in the l. which are truly heteromorphous; one part of the same l. having often leaf-like broad divisions, and the rest decompoundly linear-lanceolate or linear. The ultimate segm. of the upper l. are equally variable in being either serrate toothed or perfectly entire. Ped. of umbel 6–10 in. long ribbed and angular. Umbels large many-rayed 3–5 in. in diam., confluent flat spreading; rays subequal slender 1–2½ in. long rough with a few scattered minute points; inv. large with very long linear-setaceous segm. Partial rays very numerous short and unequal, incurved in fr. scabrous 1–3 lines long; involucels much longer than the rays and numerous. Fl. rather smaller and less pure w. than in *A. majus* above. Ovary *quite smooth*. Styles a little longer than the stylopod, strongly deflexed in fr. Stylopod convex, in fr. conical. Fr. smooth angular with strong sharp pale ribs.

I met with what seemed at the time to be entirely this pl. growing plentifully amongst corn in the S. of Grand Canary at Maspalomas, near the house of the Conde de la Vega Grande, in March 1858; but I neglected unfortunately either closely to examine or (from confidence in its identity) to preserve a spec. It is unrecorded by WB. in Phyt. Can. Sr Moniz had first in 1856 called my attention to it as distinct from the common *A. majus* L. in all its varying forms in Mad.

But for the improbability of the occurrence in Europe of so fine a pl. as *A. procerum* in the absence of all notice of it by more recent authors, the following syn. would seem rather to belong to it than to the true *A. majus* L. Sp. Pl. 349.

Ammi majus Herb. Linn.! quoad ex. Hort. Upsal., ideoque

verisimiliter *Ammi fol. inf. pinnatis lanceolatis* &c. Linn. Hort. Ups. (1748) p. 59? (not Linn. Sp. Pl. or at least only partly). *A. majus* Sloane! Herb. in BH. vol. 12. p. 85; 138. p. 55? (Duchess of Beaufort); 148. p. 162 (Petiver); 244. p. 63 (fine spec., Miller); 306. p. 91 (Uvedale). *A. majus* Sibth. Fl. Gr. iii. 66. t. 273. "A. majus var." (in pencil), Asia Minor, Aucher Eloy, Herbier d'Orient, no. 3676! Dalmatia, R. C. Alexander (H. K.)! Thus in the Sloanian Herb., of 10 spec. called *A. majus*, 4 or perhaps 5 resemble rather *A. procerum*. For invaluable help in this research into the Sloanian materials especially, I am indebted to Mr. Carruthers and the Rev. W. W. Newbould.

3. A. Visnaga (L.)

Dark or full-gr.; st. round *stout erect branched and leafy throughout, bushy*; l. all finely decompound 3–4-pinnatisect with very narrow-linear channelled elongate entire almost capillary segments; umbels subterminal on short stalks *scarcely rising above the foliage, spheroidal* large and many-rayed; rays from a *dilated thickened disk or head at top of ped.* quite smooth and even, strongly *inflexed and rigid in fr.*—Desf. i. 245; Brot. i. 444; DC. iv. 113; WB. ii. 150. *Daucus Visnaga* Linn. Sp. 348; Buch 195. no. 290.—Herb. ann. Mad. reg. 1, 2, r; PS. reg. 1, r. Dry waste places about villages and amongst cornfields. E. end of the beach at Machico; village of Caniçal; about the Pico de S. Martinho, da Cruz, &c. to the W. of Funchal; cornfields about a mile above Porto Moniz, &c. In PS. about the town in dry bed of the Ribeiro and cornfields. May–Sept.—From 1 to 3 ft. high altogether smooth with stiff erect stout hard solid shining striated bright gr. st. and copious dark or full gr. fennel-like foliage. Umbels densely confluent flat on stout stiff stalks 2–4 or 5 in. long which expand at the top into a round dilated hemispherical disk; rays very numerous crowded rather short dilated at top like the ped.; general inv. many, finely pinnate with remote long linear segments like the l. and much elongated after flg. Partial rays very numerous crowded; inv. many simple linear-setaceous. Fl. minute densely crowded w. tinged with purple in the bud. Styles and stylopod w. in the fl., afterwards often purple, the former in fr. strongly divaricato-deflexed and the latter conico-convex but less conspicuously than in the two preceding sp. Ov. quite smooth. Fr. very small proportionately, $\frac{3}{4}$ line long, smooth shortly oblong or suboval strongly ribbed.

General rays after fl. becoming very hard and stiff, bending strongly inwards as in *Daucus Carota* L. and forming of the umbel a hollow inverted cone, with the general inv. hanging down from its inverted apex. In the Canaries they are some-

times used for toothpicks, but I have never seen them so employed in Mad.

5. Bunium L.

1. B. BREVIFOLIUM Lowe. *Norça, nozinha.*

St. simple, somewhat stout and mostly straight, erect round glaucous; l. all alike, shortly stalked and broadly deltoidal, rigid decompound pectinately and subternately 2–4-pinnatisect, segments flat entire short linear-lanceolate opposite remote, sheaths of the short petioles large and broad; umbel 8–10-rayed, gen. and partial inv. 0; stylopod at first tumid or pulvinate then conic; styles very short erect, in fr. divergent; fr. oblong with the stylopod conic and valleculæ 3-vittate.—Novit. p. 21 or 543. —Herb. per. Mad. reg. 3, rrr. Highest mountain slopes or ledges of the Serra d'Agua and Curral das Freiras. At a place called the Cantareiras above the spring of the Capella das Almas, on grassy slopes or banks at a height of 5000 ft. at the base of rocky cliffs along the lofty ridge or chain running N. from the summit of the Pico Grande on the path leading down from the latter to the Encumeada de S. Vicente (Lowe). Encumeada alta on Pico Ruivo (Moniz). Said also to be found in several parts of the mountains above the Jardim towards the Serra d'Agua and Pico Grande by the shepherd-boys, who seek eagerly for the roots to be eaten raw like Pignuts (the roots of the nearly allied *B. flexuosum* With. or *denudatum* DC.) in England. To this and to their destruction by the wild pigs, which are also said to search for and devour them greedily, may be ascribed in great measure the present rarity of the pl. June–Aug.—Root a globose or oval firm hard and solid dark brown roughish tuber buried an inch or two below the surface, yellowish-w. within, from the size of a hazel-nut to that of a walnut, not crisp or fibrous but farinaceous in consistence, with an agreeable sweet nutty flavour combined with a somewhat strong taste of carrots. St. single and simple or unbranched except at top, attenuated below the surface of the ground almost to a thread quite at its origin from one of the several prominent "eyes" of the tuber and sometimes a little waved or flexuose but mostly nearly or quite straight with only a single abrupt twist at its origin: above the soil straight erect unbranched from 6 to 12 or 15 in. high and 1–2½ lines or 5 mill. in diam., robust and firm or stiff, appearing almost swollen in the middle, fistulose quite round and smooth (like the whole pl. in every part), striated faintly below, more strongly upwards, glaucous. L. small few remote and inconspicuous, scarcely glaucous shortly triangular broader at the base than long, with short very broad sheathing petioles ½–1 in. long, being themselves 1–4 in. long; their divisions mostly opposite and the ultimate segments subternate, those of the upper l. being simply acute, of the lower subobtuse with an abrupt mucro; all remote narrow

finely pectinate and somewhat stiff or rigid. Umbels 1–3 or 4, terminal and lateral with a l. at the base of the ped., the latter 1½–2 in. long, ribbed and furrowed, the former about an in. broad level-topped but not confluent, with 6–11 (mostly 8–10) unequal primary rays ½–1 in. long quite smooth but ribbed or furrowed. No trace of general inv. Partial rays mostly numerous (6–10 or 15) unequal short; constantly *without any partial inv.* Fl. w. not small crowded close in separate distinct heads, not radiant, many of the outer without stam. but all perfecting fr. Pet. pure w. rather large curled or crisped at the edges with an incurved or inflexed rather long acute *lacinula.* Stam. about the length of pet.; fil. w., anth. pale purple. Styles at first a mere short minute erect point on the large conspicuous tumid and prominent but depressed cushion-like hemispherical distinct stylopod; in fr. the latter becomes conical and the styles a little lengthened out and divergent but not reflexed. Ov. very small and inconspicuous. Fr. dark brown quite smooth and shining as if gummed or varnished, oblong or ovate-oblong, compressed laterally, the diam. at least twice the breadth of the commissure, the 3 dorsal ribs subapproximate, all sharp and pale, their interstices (*valleculæ*) wrinkled and 4-striate, each 3-vittate. Commissural *vittæ* 4, superficial only, not sunk or grooved like the dorsal in the substance of the seed or albumen.

6. Bupleurum L.

a. *Annual herbaceous.*

1. B. protractum Link.

St. mostly branched from the base, branches decumbent or diffuse and straggling; l. glaucous flaccid perfoliate, the lower lanceolate-oblong amplexicaul, the upper ovate perfoliate; umbels 3-rayed, gen. inv. 0, partial 5 always spreading horizontally leafy broadly ovate mucronate coloured; fr. thickly granulate or verruculate between the filiform slender ribs and without *vittæ.*—DC. iv. 129; Koch 321; RFG. t. 1880. f. i. *B. rotundifolium* Brot. i. 452 (not Linn.). *B. rotundifolium* β. Loisel., and *B. subovatum* Spr. and Link ex DC. and Koch. *B. rotundifolium* A, Desf. i. 229.—Herb. ann. Mad. reg. 1, c½; PS. reg. 2, r. Amongst corn and in waste or fallow ground; Mad. general as in Loo fields under Pico da Cruz and towards the Praia; PS. only here and there, as up the P. do Castello and towards the Fonte d'Aréa. March–May.—Root fibrous, not much branched whitish. St. flexuose upwards sometimes erect but mostly low and spreading with loosely straggling or declining branches which are pale whitish or purplish round firm smooth and striate. Whole pl. smooth 6–10 or 12 in. high. St.-l. closely crowded or imbricate about 3 in. long and 1 broad or in any case 3 times as long as broad; upper or floral l. shortly

and broadly ovate; all mucronate. Fl. conspicuous and handsome from the large bright greenish-y. partial inv. and orange-y. pet. Umbels numerous mostly 3-rayed, never more, rarely less. Partial inv. unequal, the 3 outer larger than the 2 inner and 3 or 4 lines long or broad, in fr. as in fl. horizontally spreading. Cal.-rim quite obsolete. Pet. deep waxy-y., middle lobe broad strongly involute. Stylopod waxy dull y.-gr. flat broadly discoidal or dilated hemispherical very large much broader than the very short styles. Fr. large tumid short abruptly truncate. —One of the handsomest pl. of its tribe, the large leafy golden-y. partial inv. twice or more than twice as long as the crowded deeper-y. tufts of fl., which they enclose like a 5-leaved cal. or the fl. bracts of a *Cornus*.

b. *Perennial shrubby.*

2. B. SALICIFOLIUM (Sol. MSS.) Lowe.

Glaucous, erect; branches smooth slender elongate erect or pendulous naked downwards; l. sessile coriaceous flat many-nerved narrow-lanceolate acuminate at each end; umbel 6–12 or 14-rayed, gen. and partial inv. small very short lanceolate or ovate-lanceolate reflexed; fr. linear or narrow-oblong, valleculæ longitudinally striate 1-vittate.—Novit. p. 21 or 543; Buch! 195. no. 288. *B. aciphyllum* WB! ii. 154. t. 70.—Shr. per. Mad. reg. 3, $\frac{c}{2}$. On perpendicular rocks and sides of most of the principal ravines; Rib. de S^{ta} Luzia near the Waterfall, Rib. da Metade, Curral das Freiras, Serra d'Agua under and beyond Pico Grande, &c. June–Sept.—A straggling often pendulous shr. with few remote long weak slender naked very smooth and even, straight or slightly curved ascending or flauntingly erect branches 1–2 lines in diam. and 1–2 or 3 ft. long, hard stiff and woody, leafy only upwards. Whole pl. 2–4 ft. high very glaucous and smooth in every part. L. somewhat oblique, but not inequilateral, about 3 in. long, 3–6 lines wide, crowded towards the ends of the branches, somewhat stiff and coriaceous but thin with many straight parallel and equal nerves on each side of the somewhat stronger but inconspicuous midrib, gradually acute at both ends with a slightly hooked or curved point at the tip. Umbels terminal and lateral at the ends of the branches forming a sort of loose naked terminal panicle with a small inconspicuous narrow l. at each division; their stalks 1–2 in. long angular striate. Fl. small y.; partial umbels distinct or not confluent, 10- or 12-fld., with 6 or 7 minute ovate abruptly pointed inv. Gen. rays slender smooth about an inch long with 5 or 6 short lanceolate inv. 1-3 lines long. Stylopod large dilated waxy-y. Styles very short divergent. Fr. 2½–3 lines long not quite 1 line broad, often a little curved by abortion of one of the mericarps; ribs prominent, their interstices not granulate but longitudinally ribbed and striated.

Vittæ 5, 4 dorsal alternate with the 5 primary ribs and 1 commissural.

Tribe II. *Seselineæ.*

7. Œnanthe L.

1. Œ. pteridifolia Lowe. *Aipo preto.*

Stoloniferous with large sessile filipendular-fasciculate fusiform tuberous roots; l. decompound 2–4-pinnatisect, lfts. cuneato-ovate or lanceolate inciso-toothed or pinnatifid, their segments or teeth acute or mucronate; umbel of about 12 always slender rays; fr. elliptic-oblong slightly compressed striated, tumid and corky at the sides or commissure, simple at the base, the length of its own pedic. or of the erect elongated persistent styles.—Prim. p. 30. *Selinum divaricatum* Buch! 195. no. 292. —Herb. per. Mad. reg. 2, 3, c. Wet dripping perpendicular rocks in most of the principal ravines, as Rib. de S^{ta} Luzia, dos Cayados, da Metade, de S. Jorge, Serra d'Agua under Pico Grande at the fountains, &c., and even on seacliffs in the north at S. Vicente, Passo d'Aréa, &c. June–Aug.—A large robust branched rank-growing pl. altogether smooth, with handsome bright-gr. fern-like foliage and watery innocuous, not thick coloured acrid or poisonous juices. Roots creeping underground forming here and there at the base of the ann. st. bundles (like those of the common garden Ranunculus (*R. asiaticus* L.)) of large often reddish-purple smooth tubers attenuated at each end, often as long and thick in the middle as the fingers and sessile at the crown of the st. St. ann. 2–5 ft. high and often an inch in diam. erect stout hollow round and even below, throwing out roots or fibres from the lower joints, angular strongly ribbed or furrowed and fork-branched upwards, bright gr. juicy crisp and edible; often purplish downwards. L. very large often 2 ft. or more long and 1 ft. broad, the lower with broader ovate, the upper with narrower linear-lanceolate very distinct or remote and proportionately small lfts. Umbels rather small or inconspicuous on moderately long (2–4 in.) strongly ribbed stalks, not confluent, of from 7 or 8 to mostly 10 or 12 unequal primary rays about an in. long not thickening in fr., and numerous partial rays forming small distinct heads of crowded minute dull w. or in bud greenish fl. Gen. inv. 1–5 or 6, partial about 10; all short linear acute gr. with the edges pellucid. Cal.-teeth distinct ovate acute erect in fr. Fl. all perfect equal. Pet. very unequal with a long strongly inflexed or incurved point or narrow lobe. Stylopods large globose and tumid. Styles in the fl. shorter or not longer than the pet. and divaricate; in fr. much elongated slender and erect, as long as the ripe fr. and pale red or purplish, with their bases or stylopods still tumid and globose. Fr. about 2 lines long and

half as broad, a little thicker in the middle than at either end and subcompressed or with the commissure or juncture distinctly narrower than the transverse diam., without any callous ring or swelling at the base, crowned by the erect persistent cal.-teeth and elongated styles. Mericarps each dorsally 7-ribbed i.e. with 3 filiform dorsal and 2 remote dilated corky or spongy marginal primary ribs, the interstices 1-ribbed 1-vittate, the 4 secondary ribs scarcely less prominent than the 3 dorsal primary. Commissural *vittæ* two. Carpophore obsolete. Colour of the whole dark brown with the broad raised even spongy spaces on each side the commissure pale.

The succulent and juicy stalk is often eaten by the country-people, but not the root-tubers. The taste is weakly aromatic, something like *Angelica*. Smell scarcely any.

Œnanthe apiifolia Brot. (Phyt. Lusit. fasc. i. no. 16; Fl. Lusit. i. 420) by spec. from Dr. Welwitsch kindly procured for me at Lisbon in June 1863 by my active and energetic friend the Barão do Castello de Paiva, is a perfectly distinct sp. with a wholly different habit and aspect, closely resembling *Œ. crocata* L., but with limpid aqueous juice as in *Œ. pteridifolia*.

8. Fœniculum L.

1. F. officinale All. **Fennel.** *Funcho.*

St. round and taper, sometimes subcompressed especially downwards; l. finely decompound 3–4-pinnate, the lower distichous; segments of lower l. stiffly divaricate short and rigid, of upper feathery or tufted and crowded rather long slender capillary-linear soft or somewhat flaccid and drooping, in the uppermost or floral l. very remote few and elongate; umbels from 4–6- to 10–20-rayed flat or concave.—Koch 323; Bab. 145. *F. vulgare* Ray Syn. 217; "Gærtn.", DC. iv. 142; Seub. Fl. Az. 42. *Meum Fœniculum* Sm. E. Fl. ii. 85. "*Meum Fœniculum* a. Spr. in Schult. iv. 433." *Anethum Fœniculum* Linn. Sp. 377; Desf. i. 264; Brot. i. 465; EB. t. 1208; Buch 195. no. 297.—Herb. per. Mad. reg. 1, 2, cc; PS. reg. 2, rr.—Seacliffs or barren hills and rocks near the sea everywhere up to 1500 ft., Funchal, Magdalena, &c. In PS. scarcely anywhere except in the Serra de fora.—Root large pale or whitish, often as thick as the fore finger and penetrating deep (2 ft. or more) into the ground, like that of Horse-radish (*Armoracia rusticana* Rüpp.), branched or divided at the crown. Fl.-st. several, one from each branch of the root-stock, 1 or 2 to 4 or 5 ft. high truly herbaceous and ann. dying quite down to the root in aut. and winter after the seeds are ripe, remotely and stragglingly branched, very smooth

or even, stiff and hard, filled with pith, naked-looking upwards. St. petioles rachis and sheaths of l. especially the lower glaucous. Foliage dark gr. lowest l. distichous stiff rigid with the segments all distinct and stiffly divaricate, the ultimate only ½–2 lines long, those of the upper becoming gradually softer and longer (6–8 lines) and those of the uppermost or floral 1–2-pinnate l. 1–2 in. long yet not pendulous or flaccid but very few and remote; in all the l. channeled and flat not truly capillary setaceous or subulate. Sheaths of l. large ample, of upper l. longer than the l. themselves. Principal umbels 3–4 in. broad, not confluent, rays unequal. Involucres 0. Fl. small, y. Stigmas sessile large globose; styles developed in fruit only, very short erect or subdivergent. Fr. oblong subcylindric (in English garden spec. thickly and shortly ovoidal) with 5 equal and nearly equidistant sharply prominent strong pale ribs without intermediate striæ. Vittæ 4 dorsal intercostal and 2–4 commissural: of the latter, 4 in the large central seeds of the main umbel and mostly 3 or sometimes only 2 in the rest.—A most variable pl. in height, foliage, size of umbels, &c.—The st., especially the barren leaf-st., clothed at the base with the closely-clasping distichously imbricated broad glaucous sheaths, always appear compressed, and often really are so, more or less, at least downwards; and the segments of the l. vary no less in length than remoteness. Thus all the characters ascribed by DeCandolle to his three sp. of the genus, *F. vulgare* Gaertn., *F. dulce* C. Bauh. and *F. piperitum* DC., are found united in different states (large or dwarf) or even stages (young or full-grown) of the present pl., as it is commonly seen wild in Mad. and the Canaries; and an examination of spec. in BH. and HH. has afforded no better grounds for their conservation.

Funchal doubtless is derived from *Funcho* (Fennel) as Carvalhal (a grove or place of Oak-trees) from *Carvalho* (an Oak), Sabugal from *Sabugo* (an Elder-tr.), Fayal from *Faya*, Seixal from *Seixo*, Pedregal from *Pedre*, Parreiral from *Parreira*, &c.

9. Crithmum L.

1. C. maritimum L. **Samphire.** *Perrexil.*

Linn.! Sp. Pl. 354; Desf. i. 248; Brot. i. 436; EB. t. 819; Sm. E. Fl. ii. 73; DC. iv. 164; Koch 329; WB. ii. 159; Bab. 146. *C. maritimum* and *C. latifolium* Buch 195. nos. 293, 294.—Herb. per. Mad. reg. 1, r. on the S. coast, cc. on the N.; PS. reg. 1, r. ND. r; GD. reg. 1, c; SD. reg. 1, r. Seacliffs and rocks at the Gorgulho, Praia Formosa, Pta do Sol, Pta de S. Lourenço, &c. here and there only on the S. coast. In the N. everywhere, Sta Anna, S. Jorge, S. Vicente, Rib. de Janella, &c. abund. July–Sept.—Whole pl. glaucous. St. several 6–12 rarely

18 in. high diffuse ascending, one from each short stout brown and woody strongly ringed or jointed suffrutescent branch of the rootstock, which is often ½ in. or more in diam. L. ternately 2-pinnate 3 or 4 in. long. Lfts. ternate remote or distinct, rather few, mostly 5–10 times rarely only 2–3 times as long as broad, elliptic or linear-lanceolate or ligulate acute or pointed at each end, stiffly succulent or fleshy crisp and juicy with a saltish aromatic taste, ½–nearly 2 in. long 1½–3 lines broad. Umbels confluent 10–20-rayed, the rays short thickish ribbed. Fl. minute greenish dirty w.; pet. very small. Stylopod large conic. Styles very short erect. Gen. and partial inv. several ovate or ovate-lanceolate spreading or reflexed. Fr. large oblong-oval very pale brown with 3 sharp prominent entire dorsal ribs and plain flat interstices, apt to be infested with some *larvæ* that eat out the seed which when perfected is roundish oval and loose in the thick spongy or corky coat of the fr.

The P^ta^ de S. Lourenço occasional state of the pl. with excessively thick hard and brittle less glaucous broader and shorter elliptic-oval or oblong lfts. only 2 or 3 times as long as broad, and often combined into a single broadly obcuneate 3-fid lft. (*C. latifolium* Buch; *C. maritimum* β. *Canariense* (Cav.) DC., ll. cc.) is too accidental and even transient a form or young depauperated state to be properly reckoned a var., occurring only in arid spots on the N. seacliffs excessively exposed to the wind and weather. *Crithmum latifolium* L. fil. = *Astydamia canariensis* DC. is a wholly different pl.; and although pretty general in the Canaries on the beach or sea-rocks, is not found in Madeira.

The l. and young st. simply boiled in vinegar are a favourite and indeed excellent pickle, esteemed by all classes in Madeira.

Tribe III. *Peucedaneæ.*

10. IMPERATORIA L.

1. I. OSTRUTHIUM L. **Masterwort.**

L. biternate; lfts. of lower l. broadly ovate, of upper lanceolate, the two side-lfts. strongly inequilateral, all sharply serrate, here and there lobed or incised; petioles long with large sheaths; general inv. 0.—Linn. Sp. Pl. 371; EB. t. 1380; Sm. E. Fl. ii. 78; Buch 195. no. 296; Spr. Syst. i. 916; DC. iv. 183; Koch 336. *Peucedanum Ostruthium* "Koch Umb. 95"; Bab. 147.—Herb. per. Mad. reg. 2, 3, r. Waterfalls and wet rocks in all

the principal ravines. Rib. de João Gomes, de Sta Luzia, da Metade, de S. Jorge, &c.; Pico Grande ascending from the Curral das Freiras, Passo d'Area, &c. in the N. July–Oct.—A tall-growing pl. with large handsome shining foliage; once esteemed a sovereign remedy under the name of Masterwort, and hence a not unfrequent weed in old gardens &c. in England, though now long since disused. Root large thick creeping, dark brown. St. 2–4 or 5 ft. high simple or sparingly branched round and even or very faintly striated, rather slender pale gr. smooth and shining like the whole pl. Lfts. large bright shining gr. slightly coriaceous or rigid with sharp rigid pale or whitish teeth; those of the lower l. 3–6 in. long and half as broad, the 2 side-lfts. being sessile very inequilateral with the outer side broadly rounded or half-cordate at the base, the middle lft. subequilateral and cuneate-stalked. Lfts. of upper l. about 3 in. long and $\frac{1}{2}$–$\frac{3}{4}$ in. wide. All are acute or acuminate. Umbels large confluent with very numerous unequal rays. Partial inv. inconspicuous linear-setaceous few or numerous, as long as or longer than the very numerous partial rays. Gen. inv. mostly 0. Fl. w. or whitish moderately large. Styles divaricate capitate nearly as long as the ov. persistent. Fr. (unripe in spec.) small oblong or elliptic, compressed transversely, the juncture broader than the tranverse diam. and slightly winged. When fully ripe it is described by Sm. (E. Fl. l. c.) as "orbicular having a sinus at top and bottom and a rounded dilated closely compressed margin;" and by Grenier et Godr. Fl. de Fr. i. 691 as "ovate-orbiculaire, émarginé à la base et au sommet, à côtés rapprochés, à marge large et plane."

Tribe IV. *Silerineæ*.

11. Krubera Hoffm.

1. K. peregrina (L.).

The only known sp.—*K. leptophylla* "Hoffm. Umb. 104. t. 3"; DC. iv. 199; WB. ii. 163 (errore typ. *K. leptiflora*). *Tordylium peregrinum* Linn. Mant. 55; Mart. Mill. Dict. no. 3. *Conium dichotomum* Desf. i. 246. t. 66. "*Capnophyllum dichotomum* Lag. Gen. et Spec. 13." "*Ulospermum dichotomum* Link Enum. Hort. Berol. i. 267." *Cachrys dichotoma* Spr. Syst. i. 892.—Herb. ann. Mad. reg. 1, rr; PS. reg. 2, rr.—Cornfields and in waste or fallow ground amongst them. Fields above the E. end of the Praia Formosa to the W. of Funchal. In PS. about Camacha here and there sparingly. April.—A rather elegant small dichotomously branched somewhat bushy stiffly erect pl. of very short duration, 6–10 or 12 in. high, with finely decompound smoky rather than glaucous dull gr. foliage. Root long simple tapshaped whitish with the smell and taste of a carrot.

St. single stiffly erect flexuosely fork-branched upwards or sometimes quite from the base with spreading side-branches and bushy; branches regularly dichotomous widely divaricate and straggling very stiff and rigid, thickish and strongly ribbed or furrowed, quite smooth except a few minute muricate points or granulations scattered here and there. L. chiefly in a loose radical tuft somewhat flaccid 3–4-pinnatisect, the primary divisions opposite, lower very remote from the upper, all deeply channeled; ultimate segments flat oblong or linear, acute or cuspidate. Sheaths large and long broadly membranous pale whitish. Umbels inconspicuous small oppositifolious in the forks of the upper branches on short stout erect furrowed stalks or nearly sessile not confluent, with 3 to 5 short stout unequal wide-spreading primary rays and about twice as many partial; both gen. and partial strongly angular ribbed and more or less muriculate. General inv. 2 or 3 ovate acuminate or broadly lanceolate short; partial 5 or 6 similar but rather narrower and longer. Fl. small inconspicuous dull w. Cal.-teeth thick fleshy distinct ovate acute persistent. Pet. very small broadly obovate and notched or roundedly obcordate, with a short acute inflexed point. Stylopod large and tumid. Styles very short and thick abrupt erect approximate purplish. Stam. about as long as pet.; anth. large, purplish. Fr. large, oval, the juncture considerably broader than the transverse diam.; each mericarp with 5 primary ribs; 3 dorsal approximate with deep interstices, sharp and entire, their sides strongly and elegantly ribbed or plaited; 2 lateral thicker obtuse and strongly ribbed or sulcated across. Secondary ribs and *vittæ* 0.

Tribe V. *Thapsieæ.*

12. MELANOSELINUM Hoffm.

1. M. DECIPIENS Schrad. et Wendl.

The only known sp.—DC. iv. 208; Novit. 20 or 542. *Selinum decipiens* "Schrad. et Wendl. Sert. Hann. iii. 23. t. 13." (DC.); Spr. i. 909.—Herb. arboriform subbiennial hapaxanthous, Mad. reg. 3, rr. Shady rocks and banks far up ravines in the north only: Rib. de S. Jorge, da Metade, do Seixal, do Inferno, &c.; in the Boa Ventura abund. on a rock to the right of the road a little below the Lombo da Palha; at S. Vicente on the perpendicular wall of rock closing the head of the little glen about 300 yards above the Limestone Quarry (Forno de Cal). May–July.—Quite one of the nobles of its tribe with its tall simple Palm-like slender st. and terminal umbrella-like tufted head or crown 3 or 4 ft. in diam. of fine pale apple-gr. foliage. Root branched hard and woody. St. smooth simple erect straight round or cylindric nearly throughout and slender, but

naked suffrutescent hard and woody downwards, 2–4 ft. (rarely 5 or 6) high and ½–1 in. in diam. or about as thick throughout as the forefinger, with a fine ample terminal spreading tuft or crown of large handsome pale but bright y.-gr. foliage. L. 1–2 ft. long 2–3-pinnatisect or -pinnate with the terminal lfts. confluent; the petioles, rachis, stalks of lfts. and their midrib beneath copiously clothed, at least whilst young, with soft downy whitish spreading pubescence. Petioles remarkably broad and large, winged, with extremely broad dilated smooth and shining sheaths which are striated with pellucid pale-gr. lines. Lfts. distinct large leaf-like 1½–4 or 5 in. long, 1–3 in. broad ovate or lanceolate acuminate sharply and unequally inciso-serrate (the serratures mucronate), smooth and shining except the midrib beneath, delicate alike in texture and colour, finely and closely pellucid-reticulate with the ribs and nerves more distinct on the upper than the under side. From the centre of the terminal leaf-crown shoots forth after 1–2 or more years the large much-branched leafy broad and crowded panicle or head, 2 or 3 ft. high of very numerous umbels, of a lighter and more delicate gr. even than the rest, and with the branches and whole inflorescence more or less hairy or pubescent. Each branch ends in an umbel, and the upper l. assume gradually the form of the general inv. Lateral umbels or branches soon rising above the central or primary which is 6–9 in. in diam. with a short stout hairy ped. General inv. 10 or 12 leafy oblong-lanceolate acuminate inciso-serrate more or less, sometimes pinnatisect sometimes nearly entire, the edges membranous and ciliate-hairy, 1–1½ in. long, 3–4 lines broad spreading or reflexed. Partial inv. 8 or 10 lanceolate entire purplish. Umbels confluent convex in the middle, much like those of *Angelica sylvestris* L., with very small crowded dirty w. or purplish more than usually fragrant fl. Primary rays about 30 unequal, the outer about 2 in. long, round slender pubescent, pale, often purplish; partial 20–25 unequal crowded pubescent, the outer fl. without stam. Ov. hirsutely pubescent. Cal.-teeth very small shallow and obsolete tipped with a minute *mucro*. Pet. all equal with a very distinct claw like those of a *Malpighia*, suddenly expanding into a rounded limb notched in the middle with an inflexed or involute-acuminate *lacinula*, their edges very minutely irregularly and indistinctly fringed or puberulous, always purple in the bud and often afterwards. Stam. longer than pet., fil. w., anth. purple. Styles long slender divergent capitate purple; stylopods very large and tumid pulvinate not conic somewhat lobed pale wax-like. Fr. dorsally flat and rather thin, oblong with nearly straight or parallel sides, abrupt or subtruncate at each end and a little cordate at the base, 5 or 6 lines long, 2½ broad, 1 thick, finely and shortly pubescent especially upwards, dark coffee-brown or black somewhat shining, obso-

letely 10-ribbed; 5 dorsal ribs (3 primary and 2 secondary) approximate equidistant subequal fine filiform obsolete or inconspicuous, the 2 commissural primary ribs at or within the inner base of the wings distinct remote. Marginal wings thin but stiff or firm, subpellucid or paler than the rest, unequally toothed or serrulate, about half a line broad, widening a little and more closely and evenly serrulate and slightly waved or plicate upwards, each ending in a prominent tooth with a deep notch at top and a shallow notch at bottom on each side. *Vittæ* 9; 5 dorsal, 2 marginal under the wings, and 2 commissural very broad and approximate in the middle of the juncture.

Though properly only once-flowering, and then altogether perishing with the very root, sometimes the branched umbel-panicle alone dies down to the central main st. which survives; and thus the pl. becomes very rarely once or twice forked or branched and more than hapaxanthous, though in no case flowering in two years consecutively. The length of time before it flowers varies according to elevation, situation, soil, supply of water, &c. Thus in gardens at Funchal the pl. is truly ann., flowering and then perishing within the same year; but in its native glens its term is rarely less than 2 or more than 3 or 4 years.

The whole pl. when cut or bruised gives out a copious fragrant glutinous transparent shining y. gum or resin with a strong scent of spirits of turpentine and carrots, or something like the fl. of the large blue Iris (*I. germanica* L.). In drying the l. turn a peculiar dull olive-brown.

First discovered wild up the Rib. de S. Jorge in 1829 (Novit. 20 or 542). Though some time previously cult. in Europe, its native country had remained unascertained. It is strictly and peculiarly indigenous to Mad., being found neither in the Açores nor the Canaries, though in the latter it is well represented by *Tinguarra cervariæfolia* (DC.) = *Athamantha cervariæfolia* DC., WB. t. 71, a pl. with equally fine foliage and frutescent st., but with apterous, fusiform, rounded (not winged and dorsally compressed or flattened) fr. and belonging to the tribe SESELINEÆ.

DeCandolle attributes the name *decipiens* to the fact of the pl. in cultivation having been formerly mistaken for *Bubon Galbanum* L. by gardeners or horticulturists.

The very minute obscure irregular pubescence at the edges of the pet. is a sort of rudimentary indication of a character developed in *Monizia*.

13. Monizia Lowe.

1. M. edulis Lowe. *Cenoula da Rocha.*

The only known sp.—Hook. Journ. Bot. viii. 295.—Herb. frutesc. per. GD. reg. 1, rrr. Seacliff on the E. side of the Great Deserta about 1000 ft. above the sea, in clefts or hollows and on ledges. March–June.—More than rivalling *Melanoselinum decipiens* in the delicacy and beauty of its large shining varnished Fern-like foliage, this fine pl. is scarcely less remarkable in size and habit. It is truly per. flowering annually many years in succession with a thick woody subarboreous but very short obese mostly simple or only once or twice branched st. or rather more or less elevated stem-like *caudex* or rootstock. Root as thick at the crown as the wrist or arm, strong and more woody than fleshy, dividing downwards sparingly and irregularly at remote intervals into a few long simple round tapering naked branches like thin carrots or cow's horns except in colour, covered with a thin very smooth membranous black skin or outer pellicle, beneath brownish, and internally, when broken, of a delicate pure w. and farinaceous dryish substance like a Pignut or tuber of *Bunium flexuosum* With., which it resembles in taste also when raw. It is much more woody hard and fibrous than a carrot, and when boiled rather resembles a bad stringy parsnip. St. or subaërial root or caudex often a foot or more high above the ground and as thick as the wrist or arm, strong and woody, black, covered upwards with the remains of old l., simple erect straight subobese or more or less swollen in the middle. Fl.-st. ann. terminal single erect 1–3 ft. high stout stiff copiously branched into a wide-spreading panicle of fl. from its base at the top or crown of the subaërial root or rootstock. L. chiefly radical broadly triangular in outline, about a foot long and as wide at the base as long, of a peculiar bright y.-gr. with a shining varnish-like polish, slightly rigid and in feel and texture recalling those of *Balantium Culcita* (Sw.); the lower finely, regularly and equably decompound 3–4-pinnatisect, the ultimate segments very distinct or subremote equal narrow-oblong or linear subobtuse sharply and regularly inciso-serrate rigid shining and very smooth their rachises throughout being on the contrary all finely puberulous; upper st.- and floral l. 2–3-pinnatisect with broad short subovate incised leafy Parsley-like segments, but otherwise like the lower l. Petioles and sheaths large thick highly developed and *both* closely but very shortly and finely pubescent like the petioles alone of *Melanoselinum decipiens*. Fl.-st., branches of panicle and ped. round strongly striated finely and shortly pubescent especially upwards. Umbels compact globosely rounded confluent 20–25-rayed, rays subequal crowded about 1 in. long stout ribbed minutely pubescent; partial rays about as many and other-

wise similar but only 2–3 lines long. General and partial inv. 6–10 lanceolate or linear-lanceolate finely setaceo-acuminate and downy i. e. very shortly velvety at the back, hairy-fringed at the edges. Fl. small dull w. Ov. and the distinct ovate erect mucronate sep. thickly pubescent. Pet. clothed all over outside at the back with short and ciliate or fringed at the edges with longer hairs quite to the mostly blunt sometimes acute tip of their ligulate or narrow-spathulate *lacinia*. Stam. twice as long as pet., anth. lilac or purple. Styles short thick erect mutually incurved or forcipate in fl., in fr. divergent. Stylopod tumid in fl., conic in fr. Fr. dorsally flattened but thickish, oblong-oval or elliptic, a little pointed or contracted at each end, 4–6 lines long, 2–3½ broad, 1½–2 thick, finely and shortly and thickly pubescent all over, pale sienna-brown or fawn-colour, 14-ribbed, the ribs all thickened obtuse corky, the 4 lateral very large, the dorsal smaller unequal. In each mericarp are visible externally 7 ribs, 5 dorsal and 2 (very large) lateral or marginal. Of the 5 dorsal ribs 3 are primary and the 2 alternate secondary, the latter often quite as prominent or even more so than the middle one at least of the 3 primary; the 2 remaining primary are small simple and invisible except on a transverse section of the fr., being placed almost on the commissure close behind the 2 remaining lateral or marginal vastly enlarged thickened and dilated fungose secondary ribs almost within the edges of the mericarp. *Vittæ* 6; 4 dorsal slender, one under each secondary rib, and 2 commissural very broad and shallow. Carpophore bipartite.

First discovered in company with T. V. Wollaston, Esq., in June 1855, but with ripe fr. only. I am now enabled to complete its description by adding the somewhat peculiar details of the fl., which confirm its approximate position to *Melanoselinum*, by the help of dried flowering spec. raised in Funchal by Sr. J. M. Moniz, the excellent and zealous botanist whose name this very rare, remarkable and interesting pl. so worthily commemorates.

Recourse is had to its roots, boiled or raw, as an esculent by the goatherds, Orchil-gatherers, or fishermen temporarily sojourning amidst those desolate and barren rocks, well named the Desertas, in lack of other supplies of food from stress of weather. They are however very stringy, dry and tasteless.

Tribe VI. *Daucineæ.*

14. Daucus L.

1. D. Carota L. *Cenoula* or *Cenoura.*

Whole pl. *hoary strigosely pubescent or hispid*; st. erect sparingly and erectly branched, altogether (with the ped.) *rough* and *reflexedly hispid or strigose*, often hirsute towards the base; l. *hispid* oblong or ovate-oblong 3–4-pinnatisect; lfts. ovate or ovate-oblong membranous leafy deeply cut and toothed, teeth ovate or ovate-oblong or ovate-lanceolate mucronate; umbels *very broad and large* on long *hispid* stalks not dilated at top, with a *large* stalked *fleshy* central abortive atropurpureous fl., *hollow* with the rays *very unequal hispid* and strongly incurved in fr., the outer fl. *large* radiant; gen. inv. pectinately 1–2-pinnate, partial pinnately 3–5-fid or simple as long as the rays, segments linear; bristles of the oblong-oval fr. equalling its breadth distinct straight slender compresso-subulate spreading, minutely capitulate and stellately glochidiate.—Linn. Sp. Pl. 348; Desf. i. 240; Brot. i. 444; EB. t. 1174; Sm. E. Fl. ii. 39; DC. iv. 211; Koch 343; Bab. 148. *D. polygamus* Gouan, DC. iv. 212?; Seub. Fl. Az. 42? *D. Carota* β. Pers. Ench. i. 307 ("excl. syn. Jacq." DC.)? *D. aureus* WB.! ii. 165; Bourg.! Pl. Can. no. 818 in BH. (not Desf.). *D. pariflorus* Bourg.! Pl. Can. no. 401 in BH. (not Desf.); WB. ii. 164? *D. neglectus a. asperocaulon* Lowe Novit. 20 or 542. *Pastinaca sylvestris tenuifolia* Ger. (ed. 1597) 873 (ic. opt.).—Herb. ann. Mad. reg. l, rrr. In barren rocky or stony places near and 200–500 ft. above the sea plentifully on the W. brink of the Rib. de S. Gonçalo a little out of Funchal to the E. along the Caniço road. March–May.—Root strong somewhat woody tap-shaped often as thick as the forefinger at the crown, whitish, smelling like garden-carrots. Whole pl. bristly with short stiff strigose whitish hairs. Foliage rather dull dark gr. and somewhat grey or hoary. St. 1–2 ft. high erect and straight or only slightly flexuose, scarcely more than once or twice erectly branched above and rarely from the base, strigose-hispid all the way up with short spreading whitish hairs becoming longer more copious and strongly deflexed towards its base. L. hispid chiefly beneath, and on their rachises, nerves and petioles, with copious short bristles; uppermost lfts. nearly or quite smooth on the upper side. Lfts. of all the l. close or crowded leafy and their teeth or ultimate segm. even in the uppermost l. as broadly and shortly ovate or lanceolate as in the lower and not at all remote or elongately linear-lanceolate as they are usually in *D. Carota* L. Ped. of umbels very long, round striated thickly strigose-hispid all their length, simple and not dilated at top. Umbels large broad confluent, in bud and in fr. concave, in fl.

convex; rays hispid round striated slender very numerous and unequal, the outer much lengthened spreading or ascending and strongly incurved in fr. Gen. inv. mostly considerably shorter than the outer rays pectinately multifid with finely linear acuminate segm. hispid beneath, and broad widely membranously bordered stalks and main divisions Partial inv. 3- or 5-fid, the inner simple linear with broad w. membranous edges; all hispid beneath and as long as the rays or longer. Fl. dull w. not turning y. in drying, reddish in the bud, the inner small, outer large radiant; central abortive fl. or umbellet large fleshy stalked prominent conspicuous, at first crimson, then fine dark atropurpureous or almost black, its pedic. very much shorter than its ped. and with several 3-fidly pinnate or 2 or 3 linear erect sheathing broadly w.-bordered bractlets and 2 or 3 inner bristles at its base. Sometimes there are more than one such abortive umbellet or fl. Fr. oval or oval-oblong 3–4 mill. long, half as wide without the bristles which are $1\frac{1}{2}$–2 mill. long slender subulate and distinct down to but subconfluent and compressed at the base, subcapitate with 1–4 very minute stellate recurved points, shining bright chestnut. Carpophore free simple entire.

This is the only *Daucus* found either by Bourgeau or myself in any of the Canary Islands: for his *D. parviflorus* Pl. Can. no. 401 from Gr. Canary in BH. differs from his Tenerifan *D. aureus* no. 818 in no essential point, being only somewhat less robust and smoother than usual with the st. rather less villous, whilst his *D. aureus* no. 818 is perfectly the more robust and hispid-villous ordinary state of the Mad. pl. In Tenerife it is not uncommon, especially about Souzal between Laguna and Orotava. I found it also in Palma and Gr. Canary. Hence it is very probably both, as it is certainly one, of Webb's two very imperfectly described Canarian *Dauci* referred by Prof. Parlatore in Phytogr. Can. to two distinct Algerian sp. of Desfontaines (*D. parviflorus* and *D. aureus*) with y. fl. It is assuredly however a mere form of *D. Carota* L. with less finely divided foliage, and all the lfts. and ultimate segm., even of the uppermost l., broader or shorter and more leafy and crowded than usual. Thus indeed originally I had named it, though I was led afterwards erroneously to regard it as the normal state of certain specimens of *D. neglectus* previously found by Webb in 1828. Gerard's fig. at p. 873 in habit and foliage (except the two upper l. with linear segm.) exactly represents the pl.

2. D. NEGLECTUS Lowe.

Nearly or quite smooth dark-gr. and somewhat *shining not hoary, branched from the base,* the branches mostly diffuse or *spreading and ascending smooth*; l. ovate-oblong or lanceolate 3–4-pinnatisect *nearly or quite smooth* at least above, lfts. ovate or lanceolate membranous-leafy deeply cut and toothed, teeth ovate-oblong or lanceolate mucronate; umbels *dense or compact,* not broad or large, on long and *slender nearly smooth or naked* stalks a little hispid upwards close beneath the umbel but not dilated at top, *without* or with a *small* stalked *inconspicuous* ill-developed atropurpureous central abortive fl., the rays *smooth slender not very unequal,* strongly incurved in fr.; fl. *small crowded* w., the outer radiant; gen. inv. as long in fl. as the rays, shorter in fr., finely ternately or quinately pectinato-pinnate with long linear segm., partial trifidly pinnate or simple linear as long as or longer than the rays; bristles of fr. crowded rather exceeding its breadth pale or whitish distinct straight slender compresso-subulate spreading scarcely or obsoletely capitulate or stellately glochidiate.—*D. neglectus β. leiocaulon* Lowe Novit. 20 or 542.—Herb. ann. Mad. reg. 1, rrr. Waste rocky places near the sea at Ponta do Sol, in the Passeio dos Platanos at the back of the beach and 200–300 ft. higher up above the village on the road towards the Lombada, as also along the seacliff road to Rib. Brava; also about 2 miles up the Machico valley, on the hill above the cave or grotto near S. Christovo. July, Aug.—Differs *primâ facie* from the Mad. *D. Carota* L. in its altogether less coarse or robust habit, more slender st. diffusely branched from the base, comparative smoothness and more delicate shining dark-gr. not at all hoary foliage. Root pale tap-shaped long and slender. St. about a foot high branched chiefly from the base or crown of the root, branches several diffuse or ascending and at least equalling in height the main st. which is mostly altogether smooth and shining like the rest, but sometimes at the base (with the sheaths, petioles, rachises and nerves of the lower l. beneath) a little hispid or pubescent, the upper surface of all the lfts. being always and the lower surface usually quite smooth. Foliage in general char. and subdivision much as in *D. Carota* L. above, but more delicate with all the segm. usually less crowded and more lanceolate, not at all thickened stiff or fleshy. Ped. slender usually 6–8 in. long always a little rough or hispid at top close beneath the umbel and sometimes sprinkled more or less further down with short reflexed bristles. Umbels smaller and more compact than in *D. Carota* L. and without the very long irregular outer rays of that sp., the fl. (especially the outer radiant) smaller w. sometimes in drying turning lemon- or sulphur-y. Abortive central fl. shortly stalked with a pair of sheathing bracts at the base of its pedic., quite small and inconspicuous

though dark atropurpureous; often entirely suppressed. Fr. as in *D. Carota* L. above, but the bristles paler, rather longer and very indistinctly capitulate or glochidiate. The rays are strongly incurved, but the umbels are scarcely "hollow" or "nest-like" in fr., owing to the much less disproportionate length of the outer rays.

In a single particularly robust or luxuriant spec. from Sr. Moniz, not only the ped. but st. also are sprinkled throughout with short w. reflexed bristles, and all the l. are hispidulous beneath.

Nearest apparently to *D. Bocconi* Guss. or *D. Gingidium* L. (*D. hispanicus* Gouan) judging from the descriptions of these pl. in Gren. et Godr. Fl. Fr. i. pp. 666, 669; and yet, though much resembling a spec. marked "D. hispanicus Gouan illustr. p. 9, Montes Pyrenæi Dr. Broussonet 1783" in BH., it is very unlike *D. Gingidium* L. in the same collection.

The characters of *D. neglectus* Novit. 20 or 542 were unfortunately taken chiefly from spec. of the S. Gonçalo *D. Carota* L. But the pl. originally intended by the former name was the one to which I now restrict it, and which first became known to me by spec. found by Webb at P^ta^ do Sol in 1828. These I was afterwards induced to blend erroneously with the S. Gonçalo pl. discovered in 1830 by myself and at first referred correctly to *D. Carota* L., though afterwards supposed to be the normal state *a.* of the P^ta^ do Sol sp.

Suborder II. CAMPYLOSPERMÆ.

Tribe VII. *Caucalineæ.*

15. Torilis Adans.

1. T. TENUIFOLIA Lowe.

Smoothish or scarcely at all harsh or scabrous; st. virgate and with the numerous branches erect and slender, nearly or quite smooth downwards; foliage soft and decompound with fine or deeply cut divisions, mostly light gr.; l. 2–3-pinnatisect soft flaccid, upper 2-pinnate, uppermost finely ternato-pinnate; lfts. deeply and finely cut, mostly narrow-lanceolate (not broadly leafy), the terminal one of the upper l. sometimes a little produced but not or scarcely drooping; umbels terminal erect in bud on long slender ped. and with 4–8 fine and slender rays; partial umbels convex; fl. rather large pure w., radiant pet. twice the

length of ov.; gen. inv. 1-leafed or 0; styles in fl. short and thick twice the length of stylopod or half that of ov., in fr. conspicuous but scarcely overtopping the rather long spreading or ascending glochidiate retro-scabrous bristles.—*Caucalis arvensis Mscr. Madera* Sol.! in BH.; Buch! 195. no. 289 (not Huds.). *T. africana* Bourg.! Pl. Can. no. 822 in BH.? (not Spr.).—Herb. ann. Mad. reg. 1, 2, 3, ccc. Banks and waste ground among brambles by roadsides, in chestnut woods, borders of thickets &c. everywhere. Rib. de Sta Luzia, S. Vicente, Seixal, &c. a universal weed, especially in dry shady places. May–Sept.—Scarcely at all harsh or scabrous. St. erect slender nearly or quite straight and virgate 1–1½ ft. high, much branched from the base upwards, the branches slender erect or erecto-patent; st. quite smooth downwards, but inconspicuously more or less sprinkled upwards, like the petioles and ped., with minute short reflexed very close-pressed pellucid strigose hairs slightly bulbous at the base. Foliage rather bright or full gr. finely cut or divided, minutely and inconspicuously but thickly adpresso-strigulose yet not at all harsh; the uppermost l. ternately pinnate, not simply ternate. Ped. 2–4 in. long slender, the umbels quite overtopping the foliage and very numerous, 1 in. in diam., not confluent, with mostly 5 or 6 slender rays which are ½ in. long and adpressedly *erecto*-strigulose. Fl. pure w. comparatively large and conspicuous, radiant pet. 1 line to $\frac{1}{10}$ in. long. Anth. pink or lilac. Gen. inv. (about as often present as wanting) of one finely linear-acuminate l.; partial of several similar l. Styles thick capitate with large or conspicuous presently dark-coloured stigmas, in fl. short not more than twice the length of stylopod or scarcely more than half the length of ov.; in fr. subelongate and conspicuous but still thick and shortish or not longer than the bristles. Fr. rather large oval with the bristles often purple.

Pl. altogether smoother, smaller finer and more delicate in habit, more copiously and less stragglingly branched, with more finely cut soft foliage and larger fl. than the two following sp. It comes nearest to *T. africana* Bourg.! (not Spr.) Pl. Can. no. 822 in BH., a Tenerifan pl., chiefly differing in the shortness of the styles: a character however which I have some reason for suspecting to be not altogether constant in the Mad. pl. From *T. helvetica* (Murr.) Gmel., Koch (= *T. infesta* Sm., Bab. = *Caucalis infesta* Curt. = *C. arvensis* Huds. = ? *C. helvetica* Jacq. Hort. Vind. iii. t. 16) and from *T. neglecta* Schult., DC., Koch (= *Scandix infesta* Linn.!; Jacq.! Fl. Austr. i. t. 46) it is quite distinct in fl., fr., foliage and habit; approaching in some respects nearest to the latter, but again receding in the short styles,

which, however, are not almost wholly invisible in fr. as they are in *T. helvetica* (Murr.).

2. T. OBSCURA Lowe.

Strigosely harsh or scabrous; st. and branches stout straggling widely divaricate strigose throughout, the latter remote; foliage harsh somewhat coarse and scanty or remote with large leafy divisions, dark lurid gr.; l. few and distant harsh ternately 1–2-pinnate, upper twice ternate, uppermost simply ternate; lfts. remote large leafy or broadly lanceolate coarsely inciso-toothed, the terminal one of upper l. conspicuously produced elongate and drooping; umbels terminal, erect in bud, on long ped., 8–12-rayed; partial umbels flat; fl. small dull w., radiant pet. as long as ov.; gen. inv. 1-leafed or 0; styles long and slender, in fl. 3 or 4 times the length of stylopod or as long as ov., in fr. elongate and quite overtopping the rather long spreading or ascending retro-scabrous glochidiate bristles.—Herb. ann. Mad. reg. 1, 2, c. Waste ground among vineyards near Funchal, about the Quinta do Valle, seacliffs to the eastward, &c. June, July.—Very distinct from *T. tenuifolia* by its robust straggling habit, stout widely forked branches, coarse scant dark-gr. leafy drooping foliage and many-rayed small-fld. umbels. Pl. 1–2½ ft. high sparingly and stragglingly fork-branched, branches stout and stiff deflexedly adpresso-strigose. Foliage peculiarly dark and lurid gr. large distinct scanty harsh and strigose, with large broad leafy recurved and drooping ternate lfts. coarsely but not deeply cut or toothed. Ped. 2–4 in. long, stout strigose; umbels not numerous or distinctly overtopping the foliage, 1–1½ in. in diam. not confluent with mostly 9 or 10 slender rays which are ½–1 in. long and adpressedly erecto-strigose. Fl. dull w. small and inconspicuous, the radiant pet. ½ line long. Gen. inv. mostly 0, when present, like the several partial, linear-acuminate. Styles capitate divaricately spreading or recurved, in fl. distinctly long and slender, and in fr. conspicuously elongate or longer than the bristles, and thus, besides the shape of the fr. itself, which resembles otherwise that of *T. tenuifolia*, at once distinguishing this pl. from the British or European *T. helvetica* (Murr.) to which in habit and foliage it in some degree approaches. Commissure of mericarps very narrow-linear with a hispid or bristly rib on each side.

3. T. BREVIPES Lowe.

Smoothish or obsoletely and not harshly scabrous; st. and branches stout erect or the latter erecto-patent and subremote, both with the petioles very minutely subpuberulous and nearly or quite smooth downwards; foliage soft and decompound with rather fine and deeply cut divisions, dark or full gr.; l. not harsh 2–3-pinnatisect, upper 2-pinnate, uppermost ternately 2-pinnate

or pinnate (not merely ternate); lfts. somewhat leafy lanceolate deeply cut, the terminal one of upper l. somewhat produced and drooping; umbels lateral oppositifolious, erect in bud, on short stout ped., 8–10-rayed; partial umbels flat; fl. small dull w., radiant pet. as long as ov.; gen. inv. 1-leafed or 0; styles long and slender, in fl. 3 or 4 times the length of stylopod or as long as ov., in fr. elongate and quite overtopping the rather long spreading or ascending retro-scabrous and stellately capitulato-glochidiate bristles.—Herb. ann. Mad. reg. 1, rrr. Waste ground amongst crops and vineyards above the Quinta do Valle near Funchal, descending from the end of the Levada de S^{ta} Luzia. July 5, 1829.—With more the foliage of *T. tenuifolia* and the fl. of *T. obscura*, this is distinct in habit from both. St. erect straight smooth and even, about 2 ft. high, with shortish erect or erectly spreading side-branches at regular intervals all the way up, not widely fork-branched and straggling. Foliage adpressedly pubescent but soft not harsh or strigose, as decompound as in *T. tenuifolia* but with larger or more leafy subdivisions. Umbels numerous but from their short ped. chiefly lateral and not rising above the foliage exactly as in *Anthriscus vulgaris* Pers. (*Scandix Anthriscus* L., EB. t. 818). Ped. stout $\frac{1}{2}$–$1\frac{1}{4}$ (mostly $\frac{3}{4}$–1) in. long strongly angular closely retro-hispid. Partial rays 3–6 or 7 lines long, not slender, closely erecto-hispid. Umbels mostly 9- or 10-rayed, $\frac{3}{4}$–1 in. in diam. Fl. small dull w. and inconspicuous, the radiant pet. half a line long. Styles in fl. long distinct and prominent. Gen. inv. mostly 0, when present linear-setaceous like the several partial inv. Fr. rather large thickly clothed with rather long bristles longer than the semidiameter of the fr. yet not more than half the length of the prominent conspicuous slender capitate divaricately spreading or recurved styles.

The foregoing description is taken from the single spec. discovered by myself in 1829 and communicated in 1832 to my friend J. J. Bennett, Esq., by whom it has been kindly returned to me for the purpose. Considering the obscurity hanging over this whole genus and the strong general resemblance of its sp., it is less surprising that it has not since been noticed either by myself or other Mad. botanists.

The Canarian *Toriles*, combined into one mass with 4 or 5 distinct European sp. in WB. ii. 166 under the name of *T. infesta* Smith, will require a careful separate investigation. At present I can only say that of the 4 or 5 that have come under my observation, with possibly the exception of *T. africana* Bourg. (not Spr.) Pl. Can. no. 822 in BH., they all appear distinct alike from every European and Mad. sp.

T. brevipes differs from *T. obscura* in its smoother scarcely scabrous less straggling or divaricate branches, more cut and divided l. without a conspicuously large and drooping elongated terminal lft., and in the smaller lateral short-stalked umbels. Approaching *T. tenuifolia* in foliage, it is at once distinguished by the short-stalked lateral umbels, small fl. and long slender styles.

4. T. NODOSA (L.).

Strigose; st. procumbent decumbent or diffuse, remotely forked; l. finely 2–3-pinnate, lfts. regularly and evenly inciso-pinnatifid, the segm. parallel narrow linear-lanceolate acute entire; umbels nearly or quite sessile lateral 2- or 3-rayed small and dense without gen. inv.; styles in fl. very short, in fr. about half the length of the bristles; fr. partly bristly partly warted. —Sm. E. Fl. ii. 44; DC. iv. 219; WB. ii. 166, 167 (in part); Koch 345; Bab. 149. *Caucalis nodosa* EB. t. 199; Desf. i. 236, 7; Brot. i. 447; Pers. Syn. i. 306; Hook. Fl. Scot. i. 88. *Tordylium nodosum* Linn.—Herb. ann. Mad. reg. 1, $\frac{c}{2}$; PS. reg. 2, $\frac{r}{2}$. Cornfields and fallow ground to the W. of Funchal between the Rib. Seco and Praia Formosa. PS. cornfields up Pico Branco and P. do Facho. March, April.—An inconspicuous pl. of humble growth, at first tufted, afterwards with weak spreading branches 6–12 in. long from the crown of the fibrous root, widely forked slender but stiff and rigid, straggling, minutely strigulose, sometimes nearly smooth, often purplish. L. harshly substrigose dark y.-gr., their ultimate segm. very regular and uniform narrow-oblong or sublanceolate acute. Umbels either sessile or with very short stout ped. 1–2 lines long, very small globosely capitate dense confusedly and obscurely 2- or 3-rayed, rays very short. Gen. inv. 0; partial many longer than the pedicels. Fl. minute regular crowded, always w. in Mad. Styles in fl. excessively short, scarcely longer than the stylopod. Fr. globosely agglomerate rather large oval or ovate heteromorphous i. e. burlike and bristly or warted; sometimes both mericarps entirely, sometimes only the outer one, or the exposed outer part of one or both, in the outer row of fr. clothed with very rough or scabrous, whitish scarcely glochidiate bristles twice the length of the inconspicuous styles and mostly but not always exceeding in length the breadth of the fr.; the inner fr. wholly and the inner parts merely of the outer fr. granulate or warted.

T. nodosa WB. ii. 166, 167 seems to be composed of two distinct sp. or at least remarkable varr., *T. nodosa* (L.) and *T. infesta* Bourg. Pl. Can. no. 821 in BH.

Tribe VIII. *Scandicineæ.*

16. Scandix L.

1. S. Pecten-Veneris L. *Agulha.*

Partial inv. 2–3-fid; beak of fr. very long dorsally compressed, strigose only at the edges.—Desf. i. 258; EB. t. 1397; Sm. E. Fl. ii. 46; DC. iv. 221; WB. ii. 167, 168; Koch 346; Bab. 149. *Chærophyllum rostratum* Brot. i. 460.—Herb. ann. Mad. reg. 1, 2, c; PS. reg. 2, c. Cornfields to the E. and W. of Funchal, along the Levada de Sta Luzia, beyond Camera de Lobos up the Pico do Rancho &c., and in PS. general up Pico do Facho, towards the Fonte d'Aréa, &c. Dec.–May.—Root nearly simple tapering. Pl. mostly bushy and leafy branched from the base 6–12 in. high, with numerous ribbed spreading or diffuse short more or less hispid once or twice fork-branched st. L. numerous bright gr. finely and equably decompound 4-pinnate, segm. all linear flat of equal breadth, the ultimate acute entire, apparently smooth but with the lens minutely strigose. Umbels stalked mostly forked or 2-rayed sometimes 1- or 3-rayed; stalks and rays stout and stiff. Gen. inv. none; partial 5 or 6 leafy ovate or broadly lanceolate, deeply 2–3-fid, sometimes simple, longer than the pedic., their edges ciliate. Fl. w. rather large subradiant. Stylopod dark purple large raised and prominent surrounding the base of the styles with an angular lobed cuplike elevated erect rim or collar. Styles very short not rising above the rim of stylopod. Carpels or seed-bearing part of the fr. 3–5 lines long compressed laterally, minutely rough or scabrous with raised points and a few short strigose bristles pointed forwards; the grooves between the primary ribs shallow, darker than the rest, like 8 dusky stripes. Beaks 1–3 in. long, 3–8 times the length of the carpels, 2-edged, the edges strigose or very rough with copious short stiff adpressed bristles pointing forwards, finely acuminate tipped with the angular plaited atropurpureous stylopods and straight erect approximate short styles. Carpophore entire undivided.

S. brachycarpa Guss. with entire partial inv. and beak of dorsally compressed fr. short scarcely twice the length of the carpels, and *S. australis* L. Fl. Gr. t. 285 with fr. laterally compressed and hispid all over, have not occurred.

Suborder III. CŒLOSPERMÆ.

Tribe IX. *Coriandreæ.*

17. Coriandrum L.

1. C. sativum L. **Coriander.** *Coentro.*

The only established sp.—Desf. i. 258; Brot. i. 462; EB. t. 67; Sm. E. Fl. ii. 67; Fl. Gr. t. 283; DC. iv. 250; WB. ii. 170; Koch 353; Bab. 151.—Herb. ann. Mad. reg. 1, ♀. Vineyards and waste ground in and about Funchal, the Valle &c. Apr.–Sept.—Whole pl. smooth of delicate and slender habit with fine flaccid drooping foliage. St. slender erect straight 1–2 ft. high loosely branched upwards. Lower l. ternately pinnate with broad roundish or obovately wedge-shaped leafy unequally cut or toothed lfts.; upper 2-pinnate with narrow or linear segments. Fl. large conspicuous pure w. or pinkish with large drooping deeply bifid radiant pet. Umbels stalked 2–3-rayed mostly 3-rayed. Gen. inv. 1 setaceo-linear, or more frequently 0; partial several linear leafy on the outer half only of the ray. Fr. globose $\frac{1}{10}$ in. in diam. shining. Whole pl. very fetid with a strong smell of bugs (*Cimex lectularius* L.).

Order XLII. ARALIACEÆ.

Fl. perfect mostly regular. Cal. mostly 4–5-toothed or entire adnate to the ovary. Pet. 5–10 or more, very rarely less or 0; *æstivation valvate.* Stam. *alternate with* and as many or rarely twice as many as pet., inserted below the edge of an epigynous disk. Ov. inferior 2- or many-celled, each cell 1-ovulate, ovule pendulous. Styles as many as cells of ov. Fr. a dry or fleshy 1–many-celled berry, each cell 1-seeded. Seed pendulous with copious albumen; embryo (except in *Hedera*) minute.—Mostly shr. or tr. often climbing, with stimulant and resinously aromatic properties. L. alternate *without stip.* often quinately lobed palmate or pedate. Fl. small umbellate or capitate.

1. Hedera. Cal. superior 5-toothed. Pet. 5–10 wholly free and not cohering at the tips. Stam. 5–10. Styles 5–10 connivent or concrete. Berry dry 5–10-celled 5-seeded crowned with the persistent cal. Embryo large axile as long as the seed.

1. Hedera L.

Ivy.

1. H. Helix L. **Common Ivy.** *Hera.*

St. woody climbing attaching itself by root-like fibres; l.

coriaceous smooth and shining angularly 3-5-lobed, those of the fl.-branches entire ovate oval or elliptic; umbels globose simple in terminal starry-pubescent or mealy panicles.—Brot. i. 299; Buch 195. no. 287; EB. 1262; Sm. E. Fl. i. 334; DC. iv. 261 (var. *a*); WB. ii. 173; Koch 353; Seub. Fl. Az. 42; Bab. 152.—Shr. or subarb. per. Mad. reg. 2, 3, c. Banks and rocks or cliffs in ravines, Rib. de S^{ta} Luzia opposite S. Roque, de S. Jorge, de S. Vicente, &c. and abundantly along the road from P^{ta} do Pargo to Porto Moniz. Aut.—St. either loosely trailing on the ground or climbing rocks (not tr. in Mad.). L. stalked dark gr. with pale milky veins especially when trailing on the ground. Fl. pale gr., pet. reflexed, style simple pointed. Berries black.

Coarse ropes or cables for their boats are manufactured from the stems of this pl. by the fishermen, but they are neither very strong nor durable.

End of Part III.

A MANUAL FLORA

OF

MADEIRA.

PART IV.

Subclass III. COROLLIFLORÆ.

Stamens inserted on the more or less tubular (gamopetalous or monopetalous) cor. Pet. more or less united or coherent.

Sect. A. *Cal.-tube adnate to the ov., limb superior. Cor. superior.*

Order XLIII. CAPRIFOLIACEÆ.

The Honeysuckle Family.

Fl. perfect. Cal.-tube united with the ov. mostly bracteate, limb superior shortly 4–5- rarely 2–3-toothed. Cor. 4–5-cleft, the lobes imbricate in bud. Stam. 4–5 free i. e. adnate only to the base or bottom of cor.-tube and alternate with its lobes. Ov. inferior 3–5-celled. Style 0 or filiform. Stigmas 3-5 or single and 2–3-lobed capitate. Fr. 1–3- or many-celled indehiscent mostly berry-like fleshy or juicy rarely dry. Alb. fleshy. —Shr. sometimes climbing or subarborescent rarely herbs and then perennial. L. opposite simple without stip. Fl. terminal and corymbose or axillary. Berries mostly red or black rarely w. or y. often connate, rarely and then scarcely eatable.

Tribe I. *SAMBUCEÆ.*

The Elder and Guelder-rose Tribe.

Cor. rotate regular, pet. 5 equal mostly coherent only at their base. Style mostly 0 and stigmas 3 sessile; in *Adoxa* styles 4–6. Cells of ov. 1-ovulate. Fr. berry-like. Raphe of seeds ventral or introrsal. Fl. small mostly corymbose.

1. SAMBUCUS. Cal.-limb small 5-fid. Cor. 5-fid rotate or urceolate Stam. 5. Style 0; stigmas 3 sessile. Fr. pulpy or juicy 3–5-seeded.—Shr. or subarb. rarely herb. fetid. L. odd-pinnate. Fl. w. or pinkish.

†Tribe II. *LONICEREÆ.*

The Honeysuckle Tribe.

Cor. more or less tubular funnel-shaped or bell-shaped, limb irregularly or regularly 5-fid. Style filiform; stigma 3-lobed capitate.—Cells of ov. many-ovulate. Raphe of seeds dorsal or extrorsal. Fl. rather large axillary often agglomerate in whorls and fragrant, w., y. or r. Fr. mostly baccate and often connate, sometimes dry or capsular.

†2. LONICERA. Cal.-limb small 5-cleft persistent. Cor. tubular funnel- or bell-shaped, limb mostly irregularly 5-fid. and $\frac{4}{1}$-bilabiate or ringent. Stam. 5. Fr. berry-like crowned by the persistent cal.-limb, 1–3-celled each cell 2–3 seeded. —Shr. often twining. L. simple often connate mostly entire.

Tribe I. *Sambuceæ.*

The Elder and Guelder-rose Tribe.

1. SAMBUCUS L.

Elder.

†1. S. EBULUS L. **Dwarf Elder or Danewort.** *Engos.*

Herbaceous smooth: l. pinnate, lfts. oblong-lanceolate gradually acuminate sharply closely and finely serrate; the lowest pair ovate remote stipulary; cymes 3-partite, fl. all perfect and distinctly stalked. Brot. i. 474; EB. t. 475; Sm. E. Fl. ii. 109; Buch 195. no. 285; DC. iv. 322 (excl. β); Koch 356; Bab. 154.—Herb. per. Mad. reg. 2, r. Shady places near cottages, by road-sides &c., nowhere apart from cultivation and principally in the north: S. Vicente, Rib. da Achada do Marques (S^{ta} Anna), between Fajãa d'Ovelha and P^{ta} do Pargo, Canhas between the Pouso and the Carvalhal, Curral das Freiras on ascent to Pico Grande, Porto Novo between Funchal and S^{ta} Cruz up the Levada a little above the mill. July.—Roots strong and large creeping extensively. St. annual succulent stout erect thickish furrowed 1–2 feet high. Foliage rather large dark full gr. very fetid; lfts. 3–5 in. long 1–1½ broad, the lowest pair shorter and broader, set low down the petiole close to the stem, like stipules. Cyme terminal mostly single; its branches subpubescent. Fl. rather large for an Elder, w. or pale flesh-colour pink outside with purplish anth.

Fr. rather large "purplish-black" or black" (Sm.) "reddish-black" (Bab.), not or scarcely eatable.

Used by the country people in fomentations for bruises or contusions.

2. S. MADERENSIS Lowe. *Sabugueiro.*

Subarboreous smooth; l. quinato-pinnate smooth, lfts. oblong-lanceolate elongate subabruptly acuminate sharply and closely serrate; cymes 3–5-partite, fl. all perfect partly sessile nearly or quite scentless.—Prim. (ed. 2) App. iv. *S. lanceolata* Herb. Banks! Buch! 195. no. 284. *S. nigra β lanceolata* Lowe Prim. 31.—Tr. Mad. reg. 2, 3, $\frac{r}{2}$. Deep moist woods and thickets; occasionally in cottage gardens. Woods a little below the Encumeado de S. Vicente, at the bottom of the Voltas in the Chão de Madeira above Seixal, Rib. de Ponteclero or dos Queimados (W. branch of the Rib. de S. Jorge), Rib. de Bõa Ventura, Ravines above S^{ta} Anna; in gardens at Funchal, Camacha &c. Fl. May, June; fr. Aug., Sept.—A small tr. 10–20 ft. high with bushy head and straggling branches exactly as in *S. nigra* L., the trunk seldom thicker than the thigh. Whole pl. quite smooth. L. shining bright full gr.; lfts. mostly 2 rarely 3 pairs, the odd one sometimes double, all shortly stalked with a small inconspicuous stiff stipel at the base of the petiolet; terminal and upper pair of lfts. much elongated and acuminate, often 5 or 6 in. long and only 1–2 broad, the lower pair somewhat shorter and broader in proportion; all sharply serrate. Cymes terminal mostly 5-partite and smaller with shorter stouter and stiffer branches than in *S. nigra* L. but often 5 or 6 in. broad. Fl. and branches of cyme pale yellowish-w. or cream-col. almost quite scentless or without the peculiar Frontignac fragrance of *S. nigra* L., a few sometimes hexamerous and many of them sessile. Sep. acute. Pet. spreading or reflexed oval rounded at tip. Stam. spreading or reflexed; anthers rather large y.; fil. w. Ov. pale yellowish faintly ribbed. Fr. mostly pale yellowish-gr. rarely black, milder and sweeter than in *S. nigra* L. and not decidedly unpleasant. A xarope (syrup or decoction) of the fl. is a favourite remedy.

Very distinct from its Canarian representative, *S. palmensis* Link, which is equally arboreous and has oblong-lanceolate lfts., but is altogether pubescent. *S. palmensis* occurred not unfrequently in the ravines, Barranco de Galga, dos Nogales, del Agoa, &c., towards Los Sauces in the N. of Palma, in 1858.

It is remarkable, considering the abundance of *Viburnum rugosum* Pers. (BM. t. 2082) in the Canaries, and that *V. tinus*

L. and DC. flourishes in gardens even down in Funchal, that Madeira possesses no indigenous *Viburnum*.

†Tribe II. *Lonicereæ*.

The Honeysuckle Tribe.

†2. LONICERA L.

Honeysuckle.

†1. L. ETRUSCA Santi. *Madresilva.*

Branches sarmentose flaunting and somewhat twining or twisting; l. deciduous subcoriaceous obovate obtuse abruptly mucronulate shining above, glaucous beneath, the lower shortly stalked, the upper sessile broadly connate or perfoliate; heads of fl. terminal distinctly stalked mostly ternate.—Santi Viagg. i. 113. t. 1; Spr. i. 757; DC. iv. 331; Koch 357; Gren. et Godr. ii. 10.

β. glabra; wholly smooth. *L. caprifolium* Buch 195. no. 286 (not Linn.).—Shr. Mad. reg. 2, cc. Chestnut woods on trees banks and hedges in all parts of the island e. g. the Mount, Camacha, up the Machico valley, Jardim, Canhas, Fajãa d'Ovelha, P^ta^ do Pargo, Prazeres, S. Vicente, Arco de S. Jorge, S^ta^ Anna, P^co^ da Cruz, &c., but nowhere apart from cultivation. Apr., May. —An extensively spreading shr. smooth in every part, with long weak climbing smooth pale ash-grey shoots or branches; l. stiff flat not undulate 1–2 in. long $\frac{3}{4}$–$1\frac{1}{2}$ in. broad, the lower obovate or broadly and shortly spathulate, distinctly but shortly stalked; upper sessile very obtuse broadly connate; all quite smooth on both sides and with a minute abrupt mucro. Fl. in large subternate rather long-stalked heads at the ends of the branches, altogether finer or more slender than in *L. caprifolium* L., yellowish and more or less reddish, deliciously fragrant. Ped. of heads slender but stiff and erect $\frac{1}{4}$–$1\frac{3}{4}$ in. long, mostly ternate sometimes brachiately quinate rarely single from the uppermost connate pair of l. Cal.-teeth short half-ovate subacute. Style smooth. Cor. altogether smooth, tube about $\frac{1}{4}$th longer than the limb; upper lip obtusely 4-lobed, lower narrow entire. Berries agglomerate connate at the base crowned with the persistent cal., dark yet bright yellowish-red.

The l. are, strictly speaking, in Mad. only half-deciduous, the old l. usually remaining on the pl. during its period of rest throughout the winter till Feb. or March and falling only when the new buds begin to shoot. This is equally the case however in Madeira with the Oak, Plane, &c.

Order XLIV. RUBIACEÆ.

The Coffee and Madder Family.

Fl. mostly perfect regular. Cal.-tube united with the ov., limb superior mostly regular and 4–5-fid, rarely 2–3–6-fid or entire. Cor. regular infundibuliform or rotate, mostly 4–5- rarely 3–6–8-fid. Æstivation mostly valvate. Stam. free inserted on the throat or tube of cor. as many as and alternate with pet. Ov. inferior mostly 2-celled rarely more or only 1-celled; ovules in each cell 2 or many but mostly single erect. Styles 2 united or distinct; stigmas mostly 2. Fr. dry or fleshy (drupaceous or baccate) mostly indehiscent often didymous and bipartite. Alb. horny or fleshy large enclosing the straight embryo. — Herbs, shr. or tr. with often square jointed st. or branches. L. simple entire with a marginal nerve, opposite or sometimes whorled, mostly 2-stipulate. Fl. mostly in cymes or panicles, sometimes in heads, distinct or connate. Fr. rarely edible, but roots as in the Madder (*Rubia*) or Ipecacuanha (*Cephaelis, Psychotria*), bark as in the invaluable *Chinchona*, or horny albumen of seeds as in the Coffee-tr., sometime of worldwide celebrity.

Suborder I. COFFEINÆ.

Ovules 1 rarely 2 in each cell of ovary. Fruit-cells 1- rarely 2-seeded.

†††Tribe I. *COFFEEÆ.*

The Coffee Tribe.

Style single, stigmas 2, sometimes concrete or capitate. Fr. baccate or drupaceous 2-celled 2-seeded. Seeds convex at the back, flat on the inner side with a longitudinal groove in the middle.—St. rounded or compressed. L. opposite.

†††1. Coffea. Cal.-tube very short not produced or persistent in fr., limb 4–5-toothed. Cor. funnel-shaped, limb 4–5-partite, throat naked. Stigmas 2 linear. Berry or drupe umbilicate not crowned with the cal. 2-seeded, seeds enclosed in a membranous parchment-like skin or endocarp. —Tr. or shr. with entire coriaceous l. Stip. interpetiolar binate entire. Fl. axillary.

Tribe II. *ANTHOSPERMEÆ.*

Fl. often imperfect polygamous. Styles 2 distinct; stigmas elongate papilloso-pubescent or hairy. Fr. dry of 2 indehiscent 1-seeded carpels or mericarps separating when ripe.—

Small innocuous shr. or herbs. L. opposite or whorled. Fl. small inconspicuous scentless.

2. PHYLLIS. Fl. polygamous i. e. perfect or male and female: cal.-tube compressed obovate, limb obsolete. Cor. rotato-campanulate shortly tubular, limb deeply 5-partite. Stam. 5 inserted at base of cor. Stigmas 2 linear subsessile on the ov. Fr. dry obovate compressed 2-partite; carpels 1-seeded pendulous from the top of the central axis.—Small shr. with opposite or whorled l. and terminal panicles of small gr. often imperfect (male or female) fl.

Tribe III. *GALIEÆ.*

The Madder Tribe.

Fl. rarely imperfect. Styles 2 distinct; stigmas capitate. Fr. dry or rarely fleshy, of 2 indehiscent 1-seeded carpels or mericarps mostly separating when ripe.—Herbs occasionally suffrutescent. St. 4-angular. L. verticillate. Fl. small, cor. stellate, lobes valvate in bud. Roots often yielding a red dye.

3. SHERARDIA. Cal.-tube ovate, limb 6-*fid*, teeth *enlarged after flowering*. Cor. *funnel-shaped, tube elongate*, limb 4-fid spreading. Stam. 4 exserted. Style 2-fid. Fr. dry of two carpels, each *crowned by* 3 *teeth of the persistent cal.*

4. GALIUM. Limb of cal. *obsolete* faintly or obscurely toothed. Cor. *rotate* 4- (rarely 3-) partite. Fr. *dry, not crowned by the cal. limb, didymous*, of 2 globose or ovoidal indehiscent 1-seeded carpels.—Square-stemmed herbs sometimes suffrutescent with whorled l. or stip. and small w. sometimes y. fl. in axillary cymes often forming spuriously terminal panicles.

5. ASPERA. Like *Galium* but fr. oblong or subcylindric composed of 2 linear-oblong mericarps or carpels.

6. RUBIA. Like *Galium* but cor. 5–4-partite and fr. juicy baccate.

†††Tribe I. *Coffeeæ.*

The Coffee Tribe.

†††1. COFFEA L.

†††1. C. ARABICA L. **Coffee-tr.** *Cafeêiro.*

L. oblong-lanceolate acuminate; ped. short axillary aggregate; fl. 5-fid, stam. exserted, fr. ovoidal.—Linn. Sp. Pl. 245; Lour. Fl. Coch. i. 144; BM. t. 1303; DC. iv. 499.—Shr. or

subarb. Mad. reg. 1, cult. cc. Frequent in gardens and vineyards (rarely in plantations) about Funchal, S^ta^ Cruz, Machico, Rib. Brava, and other villages chiefly on the S. coast, and scarcely flourishing above 600 or 700 ft. Fl. May, June; fr. Aug., Sept.—Left to itself the Coffee-pl. is a slender pyramidal shr. from 6–18 ft. high, with generally 2 or 3 erect straight stiff virgate pale-barked st. or main branches and numerous simple elongate horizontal or slightly drooping leafy side-branches. Foliage evergreen very dark or blackish shining gr. L. coriaceous but not stiff, wavy drooping 4 or 5 in. long 1½–2 in. broad; petioles short. Stip. combined into a pair of opposite close-pressed ovate cuspidate interpetiolar scales. Fl. towards the ends of the side-branches all along the gr. last year's shoots, rather large and elegant, of a pure snow-w. contrasting with the dark l. and deliciously fragrant like Jasmine, but of very short duration. Pet. rather long and narrow. Berries or drupes mostly ovoidal ½–¾ in. long, ⅓–½ in. broad, sometimes nearly globose, becoming from bright red dark blood-red or almost black, their thick, tough, leathery skin or flesh slimy inside and sweet but not palatable.

Twenty or 30 years ago Coffee was much more cult. in Mad. than it has been for the last 10 or 15 years. This is partly owing to the destruction of the pl. by *Oidium* or other blights simultaneously with the Vines. But although formerly the yield was abundant and the produce of very superior quality—the small and delicate "berry" being considered in London not inferior in excellence to the best Mocha—the cultivation of Coffee must always be confined within too narrow limits in Mad. to allow it ever to become a growth of much commercial value, and particularly as it only flourishes in situations capable of being turned to more profitable account.

Tribe II. *Anthospermeæ.*

2. Phyllis L.

1. P. nobla L. *Cabreira; Seisim or Seisinho.*

The only sp.—Linn. Sp. 335; Buch 195. no. 283; DC. iv. 579; WB. ii. 191. "*Simpla Nobla Canariensium* Pluk. Alm. 347." *Valerianella Canariensis frutescens Simpla Nobla dicta.* Dill. Hort. Elth. ii. 405. t. 299. f. 386.—Shr. Mad. reg. 1, 2, 3, 4 (chiefly 2, 3), ccc; PS. reg. 1, 4, r; GD. and SD. reg. 1, r. Rocky cliffs from the sea up to the tops of the highest peaks in Mad. everywhere; in P^to^ S^to^ on the I. Debaixo, cliffs on the

N. coast near the Fonte d'Aréa and rocky summit of P. do Facho. Apr.–July.—A small shr. 1–3 or 4 ft. high either entirely smooth or more or less pubescent with shining rather light or bright gr. foliage and copious terminal panicles of inconspicuous small gr. fl. scentless like the whole pl. Branches diffuse ascendently erect and mostly elongate. L. not deciduous yet not stiff or coriaceous stalked oblong-lanceolate or lanceolate 2–3 in. long, ½–1 in. broad entire, opposite in pairs or 3–4-nate in whorls. Petioles dilated and amplexicaul or combined at the base by the half-ovate short or linear-ligulate or lanceolate entire very variable stip. Panicles oblong leafy many-flowered 6–12 in. long. Fl. in short stalked opposite leafy compound repeatedly forked small crowded and often close congested axillary panicles scarcely longer than the leaves, 1 line in diam., partly perfect, partly male or female on the same or different pl. Cal.-limb quite obsolete. Cor. obovate in bud, lobes in fl. reflexed caducous. Anthers large oblong exserted. Fr. drooping pale brown small obturbinate or pear-shaped slightly notched or 2-toothed at top, 1½–2 lines long. Pedicels and branches of panicle often slender capillary; the former erect in fl., in fr. slightly drooping.

It is impossible to draw any line between the smooth and hairy or pubescent states of this very variable pl. The former is by far the commonest, but passes insensibly into the latter. The few-fld. state *β pauciflora* DC. (*P. pauciflora* A. Rich.) is even still less separable.

Nobla is a corruption from the Spanish *Simple noble* (i. e. *Herba nobilis*, the noble herb or pl.) by which name Plukenet reports it to be called, though in Tenerife, Palma, Gomera and Hierro where I met with it, I heard of no such name. Webb gives *Capitana* as its name in Palma: in Gomera at Hermigua it is called *Canotilla*. I heard nothing of its virtues, and in Madeira it is accounted worthless except partially, or in want of anything better, for fodder.

Tribe III. *Galieæ*.

The Madder Tribe.

3. SHERARDIA L.

1. S. ARVENSIS L.

The only sp.—Linn. Sp. Pl. 149; Desf. i. 126; Brot. i. 152 (*Scherardia*); EB. t. 891; Sm. E. Fl. i. 196; Buch 195. no. 281;

DC. iv. 581; Koch 358; WB. ii. 189; Seub. Fl. Az. 34, 35 (var. *pubescens* Hochst.); Bab. 155.—Herb. ann. Mad., PS., reg. 1, 2, 3, ccc. In vineyards, cornfields, waste and cult. ground or by road-sides everywhere; not observed in the Desertas. March–June, but here and there at most seasons.—A small unprofitable weed with rather pretty bright lilac fl. inclining oftener to bl. than pink and sometimes very pale or even w. Whole pl. setosely scabrous and more or less hirtosely pubescent. St. prostrate sometimes cespitose, the ends ascending, 3–9 in. long, sharply 4-angular, pubescent or sometimes almost hirtose. L. 4–6 in a whorl bright full gr. hirtosely pubescent all over above, on the midrib and edges only beneath, rather broadly and shortly lanceolate sharply cuspidate, very scabrous. Fl. small 4–8 together in little terminal crowded sessile heads surrounded by 8 spreading nearly smooth but scabrous bracts shaped like the l. but larger or broader and in fr. dilated pale and connate at the base, forming a persistent invol. Teeth of cal. in fr. enlarged ciliato-setose narrow-acuminate. Fr. setoso-scabrous, dark brown or black.

4. Galium L.

§ 1. *Platygalium* Koch. L. 3-nerved; root per.; st. unarmed without deflexed prickles; fl. in terminal panicles.

1. G. ellipticum Willd.

Suffrutescent hairy-pubescent or glabrescent; st. horizontally hirtoso-pilose or lanuginoso-villous ascending or diffuse, much branched and shrubby downwards, the fl.-branches elongate and suberect; l. 4-nate subsessile or shortly petiolulate oval or elliptic, the lower broad obtuse abruptly mucronate, the upper narrower and more pointed or acute, all pale gr. or hoary reticulate subcoriaceous persistent, more or less piloso-pubescent principally on the nerves and margins, the latter ciliate with longer stiffer hairs, all pointing forwards; panicles terminal leafy composed of many-fld. trichotomously compound cymes, the branches ped. and pedic. of these finely capillary and at first upright, then divaricately spreading; fl. pale greenish-y. or cream-col.; fr. subglobose more or less uncinato-setulose.

α. *lucidum*; shining more or less glabrescent; st. thinly or hirtosely pilose; l. mostly with the nerves and edges only ciliato-pilose nearly or quite sessile, mostly obtuse; branches of panicle, ped., pedic. and fl. nearly or quite smooth.—*G. ellipticum* Willd. "Enum. Suppl. (1813);" DC. iv. 599; Gren. et Godr. ii. 17. *G. ellipticum* Willd. var. *glabrescens* E. Bourgeau! Pl. Can. ex Itin. 2do (Coss.) in HK., HB. and Herb. Mus. Paris. *G. rotundifolium* Linn. Sp. Pl. ed. 2. p. 156

(excl. var. β, p. 157); Buch! 195. no. 278 (not Linn.! Sp. Pl. ed. 1 nor Herb. Linn.!). *G. rotundifolium* var. *glabrum* E. Bourg. ! Pl. Can. no. 831 in Herb. Paris. (a remarkably narrow-leaved form or perhaps distinct var.). *G. ovalifolium* Schott. in Iside (Jena 1818) p. 821. " *G. Barrelieri* Salzm. Bot. Zeit. 1821. p. 107." Bocc. Ic. et Descr. Pl. Sic. pp. 10, 11. t. 6. ff. 1. Moris. iii. § 9. t. 21. f. 5. Barrel. Ic. t. 324.—Per. suffrut. Mad. reg. 3, $\frac{c}{2}$. Dry rocky banks and cliffs in ravines; Rib. de S^ta^ Luzia about the Waterfall, Serra d'Agua under Pico Grande, &c. June–Aug.—St. 4-angular unarmed or without deflexed prickles, per. woody smooth pale brown rounded and naked repeatedly branched and trailing or procumbent downwards, with numerous erect or ascending ann. leafy moderately elongated fl.-branches 1–2 ft. long sprinkled more or less thickly with distinct moderately long or short spreading soft though stiffish hairs. L. subsessile or with very short ciliato-hirtose petioles, of a peculiar shining pale subpellucid gr. and thin substance like oiled paper, yet stiff and subcoriaceous, not turning black in drying, normally 6–12 lines long and 4–8 lines broad but varying often both in size and shape, the upper or sometimes all proportionately narrower or elliptic-oblong, all except the uppermost mostly obtuse or subobtuse with a small abrupt *apiculus* or leafy mucro, rarely 4-nerved, finely pellucido-reticulate when held up to the light, very closely and minutely puncticulato-granulate, ciliated principally on the nerves and edges with quite soft whitish forward-pointing hairs, and sometimes also shortly adpresso-pubescent all over above, but mostly glabrescent and never villous-hoary. Cymes short many-fld., in terminal leafy panicles, and with their more or less divaricate, not lax or elongate, capillary divisions almost quite smooth. Fl. 2 lines or 3–4 millim. in diam. Pet. ovate shortly apiculate. Fr. dark coffee-brown or black, somewhat sparingly or thinly echinulate with soft short hooked whitish bristles, globose or globosely reniform, each mericarp shortly kidney-shaped and 2 millim. long by 1½ broad or thick.

Though not described as a Can. pl. in the Phytogr. Can. by Webb himself, this precise var. certainly occurs in the Canaries (Tenerife at Las Mercedes near Laguna, &c., E. Bourgeau ex Itin. 2^do^). Somewhat more common however in the Can. (sent thence by Bourgeau and found by myself at Barlovento in the North of Palma and in an intermediate less villous-hoary smaller-leaved state at El Golfo in the north of Hierro) is Webb's *G. rotundifolium* var. *villosum*; a pl. not hitherto observed in Mad., though in Sir J. E. Smith's Herb. in the Linn. Society, there is an undoubted spec. (with a pencil

note "near *G. elegans* of Wallich") supposed to have come from thence. This Can. pl. seems indeed at first sight very different in its grey or hoary aspect from the Mad. pl. above described; but I have failed entirely to discover any permanent or constant distinction stronger than varietal between the two. It will therefore stand as *G. ellipticum* Willd.,

β. villosum; villous-hoary or canescent; st. grey-lanuginous or densely villous; l. all over villous especially beneath, distinctly petiolate, mostly acute; branches of panicle, ped., pedic., ov. and cor. outside hoary villous.—*G. Neesianum* Req., DC. iv. 600. "*G. hirsutum* Nees et Buch in Hort. Ber. p. 113. t. 22 (non Ruiz et Pav.)." *G. rotundifolium* var. *α villosum* WB. ii. 185 (not Linn.). *G. ellipticum* E. Bourgeau! Pl. Can. ex Itin. 2^do^, Teneriffa (Coss.) in H. K. et Herb. Mus. Paris.—Hab. in Canariis in sylvis latebrosis salebrosis. Necnon fortasse huc quoque spectat *G. rotundifolium* Webb Spicil. Gorg. 133; Schm. Fl. Verd. 209, planta microphylla valde incano-villosa ad alt. 5000–6000 ped. in dumetis Montis Gordo S^ti^ Nicolai Insularum Viridensium obvia. Sed ob defectum inflorescentiæ fructusque in exemplaribus adhuc visis suspensus hæreo.

The original *G. rotundifolium* Linn. Sp. Pl. ed. 1. p. 108 is assuredly, both by his diagnosis and quotation of Morison t. 21. f. 4, simply and purely *G. rotundifolium* of DeCandolle, Koch, Grenier et Godron &c.; mainly distinguished by its annual herbaceous erect simple st. not above 8 or 10 in. high, and few-fld. less developed cymes, and not found either in the Canaries or Mad.

G. rotundifolium Linn. Sp. Pl. ed. 2. pp. 156, 157, is a compound: formed primarily (p. 156) of a pl. not before contemplated by him in ed. 1, for which he quotes Moris. t. 21. f. 5 and Boccone, adding in MS. *propriâ manu* in his own copy of Sp. Pl. ed. 2, to his imperfect printed reference to the last named author, "ic. 10. t. 11. f. 5,"—which is clearly an error for t. 6. f. 1, caused by his having mistaken the number 11 of the *page* close above the plate at the right hand corner for that of the plate itself* which is in small inconspicuous print at its left hand upper corner, and then having counted the separate figures of the plate backwards from right to left.

* Lamarck (Dict. i. 299), quoting Boccone, has made precisely the same mistake as to the number of this plate.

Now this pl. is plainly, both by the syn. and diagnosis, *G. ellipticum* Willd., DC. &c., and to it he appends, unfortunately (p. 157) as a var. β, his former *G. rotundifolium* of ed. 1. p. 108.

The name *rotundifolium* belongs therefore plainly and simply to the pl. originally so designated by him in ed. 1. And his *G. rotundifolium* ed. 2. p. 156 (excl. var. β p. 157) merges into a syn. of *G. ellipticum* Willd., DC. &c.

It can scarcely be considered otherwise than a mere accident or inadvertence that in his Herbarium he has inscribed *propriâ manu* the name *rotundifolium* on an indubitable specimen of a pl. subsequently called by him (Mantissa, p. 38) *Asperula lævigata* and at variance *in toto* with the syn. and diagnosis of both his *G. rotundifolia* in Sp. Pl. ed. 1 and 2.

The widely diffused European true *G. rotundifolium* L. (ed. 1) is quite distinct from every form of the Mad. and Can. pl. by its altogether smaller size and more delicate habit, its slender simple erect herbaceous st. scarcely above 6 or 8 in. high, its smaller pedunculate leafless lax few-fld. less branched or decompound panicle, with the subdivisions longer and more spreading and the fl. more remote. Its correct synonymy will stand thus:

G. rotundifolium Linn. Sp. Pl. ed. 1. p. 108 (not Herb. Linn. !). *G. rotundifolium* β Linn. Sp. Pl. ed. 2. p. 157. *G. rotundifolium* DC. Prodr. iv. 599 (excl. syn. Linn., Bocc. et Moris.). *G. rotundifolium* Koch ed. 2. p. 364 (excl. syn. Linn.). *G. rotundifolium* Gren. et Godr. ii. 17 (excl. syn. Linn.). *G. rotundifolium* Lam. Dict. ii. 577, 578 (excl. syn. Bocc., Moris., Barrel. et Linn.). *Asperula lævigata* β Lam. Dict. i. 298 (excl. syn. Moris., Barrel. et Boc.).—Icon., Moris. t. 21. f. 4; Barrel. t. 323.

I have lately received as "sp. Mad. nov.?" from my vigilant and unwearied friend the Barão do Castello de Paiva, a single dried example of a pl. found recently by one of his collectors on "a rock above the Icehouse" in Mad. It is entirely smooth or glabrous, dwarfish with small l. (2–4 lines long, 1–2 broad) and depauperated few-fld. cymes exactly as in Moris. t. 21. f. 4 and Barrel. t. 323, i. e. *G. rotundifolium* L. (ed. 1) verum; insomuch that I was inclined at first to think it really was that

pl. Besides the perfect smoothness of its st., l. and panicle, the l. are stiffer or more coriaceous and the fr. is much more thickly clothed or hirsute with copious long pale or whitish hooked bristles than in the ordinary Mad. pl. Still the st. is branched upwards and distinctly suffrutescent and trailing or procumbent downwards: so that, at least for the present, I can only regard it as a starved depauperated dwarfed extreme glabrescent state of *G. ellipticum* α. *lucidum* supra, from a high mountain elevation (nearly 6000 ft.).

§ 2. *Eugalium* Koch. L. 1-nerved; root per.; st. unarmed without deflexed prickles; fl. in terminal thyrse-like panicles.

2. G. PRODUCTUM Lowe.

Suffrutescent nearly or quite smooth shining; st. 4-angular ascending or diffuse slender stiff and wiry mostly elongate and climbing, woody downwards; l. 6–8-nate persistent rigid coriaceous shining mostly smooth sometimes pubescent linear-lanceolate cuspidate stiffly reflexed with the margins reflexed or revolute (at least when dry) and either entire or obscurely or irregularly spinuloso-serrulate; panicles terminal oblong elongate many-fld. compound and much branched trichotomously, branches and pedic. crowded short divaricate capillary; fl. rather large dirty w. or pale cream-col., pet. abruptly elongato-apiculate or acuminato-aristate; fr. small smooth and even.—Prim. 29; Novit. 541 or 19. *G. Mollugo* Buch ! 195. no. 277 (not Linn., Sm., &c.). *G. aristatum* Holl's List (not Linn., Sm., &c.). Suffrutesc. per. Mad. reg. 2, 3, ccc. Dry rocky places and amongst brambles everywhere. Apr.–Aug.—Varr. :—

α. St. smooth; l. narrow, marginal spinules indistinct or altogether wanting.—*G. productum* Prim. et Novit. ll. cc.—Rocks between the Valle fermosa and the Rib. de João Gomes; at the Mount, &c.

β. Dwarfish bushy leafy; st. subpubescent; l. somewhat broader and shorter, their marginal spinules more distinct or regular.—Serra d'Agua under Pico Grande and elsewhere general above 2000 ft.

A very variable pl. in all its characters; so that β, though mostly distinguishable from α by its bushy leafy habit and short st. or branches beside the other notes above mentioned, is scarcely more than a dwarfed or starved state of the pl. from dry open or exposed higher elevations (2000–5000 ft.).

The following description is taken entirely from α, gathered

on the rocky west bank of the Rib. de João Gomes 400–800 ft. above Funchal.

Whole pl. smooth and shining. Root and rootstock woody. St. slender brittle strongly 4-angular stiff, not at all nodulous or swollen at or above the joints or whorls of l., quite smooth and even; the flowering branches produced and trailing extensively amongst rocks and stones or climbing to the height of 4 or 5 ft. amongst bushes, with short leafy side-branches, pale brown and shrubby downwards and clothed like the barren branches with the strongly deflexed imbricately crowded whorls of the old persistent l. L. light gr. not at all glaucous, very shining hard stiff and stiffly spreading or strongly deflexed not reticulate, the margins revolute with a few irregular obscure forward-pointing spinules but sometimes quite even and entire, not often less than 7–8-nate even on the smaller branches, 2–4 lines long, ½–1 line broad, tipped with a fine short awn-like point. Fl. rather large for a *Galium*, 4–5 millim. in diam., w. with a very slight yellowish or cream-col. tinge, produced abundantly in short lateral leafy crowded 3-chotomously decompound cymes from the leaf-whorls towards the ends of the branches, forming an elongated terminal many-fld. oblong thyrse or panicle with finely capillary strongly divaricated (not erect or ascending) short crowded branches and pedic. or fruit-stalks. Pet. thickish ovate abruptly producto-apiculate faintly 3-nerved or furrowed submarginate much longer than the ov. Styles distinct nearly to the base; stigmas capitate globose. Fr. small 1½–2 mill. in diam. quite smooth and even, one of the two oblong-oval or slightly kidney-shaped mericarps of which it is composed usually smaller or abortive.

G. cinereum All., DC. is a very distinct sp. with glaucous l. and st., and erect subelongated pedic.—*G. cinereum* Sm. (EBS. 2783) is probably a mere var. of *G. erectum* Huds. (EB. t. 2067), which seems even still more distinct than *G. elatum* Thuill. (*G. mollugo* EB. t. 1673) from the Mad. pl.

It is remarkable that this almost universally diffused and abundant Mad. pl. has never occurred in the Canaries.

§ 3. *Aparine* Koch. L. 1-nerved; root ann.; st. armed more or less with deflexed prickles; fl. cymoso-paniculate or axillary and 1-3-nate.

a. Cymes on axillary stalks longer than the leaves or short subabortive side-branches, more or less compound, leafy; paniculate or subpaniculate, forming a more or less distinct panicle.

3. G. PARISIENSE L.

St. slender brittle suberect or ascending smooth but rough at the 4 angles with numerous minute deflexed prickles; l. 5–8-(mostly 7-) nate at first erect, then spreading or deflexed linear or linear-lanceolate aristate or bristle-pointed, the margins serrulate and the nerve or sometimes more of the upper surface hispid or rough with forward-pointing spinules; cymes small few-fld. on short remote leafy stalks or side-branches nearly all the way up the st. forming an interrupted irregular indistinct sort of oblong elongate panicle, 2–3-chotomously twice or thrice forked with capillary divaricated branches and pedic., the latter smooth 3–4 or even 5 times the length of fr.; fl. very small 2–3-nate; pet. erecto-patent ovate subobtuse; fr. small hispid or smooth and finely granulate.—Linn. Sp. 157; Vill. Pl. Dauph. ii. 332; WB. ii. 184; Koch (ed. 2) 363; ejusd. *γ divaricatum* 1025 (excl. syn.)?

β. leiocarpum, Tausch, Koch l. c.; fr. smooth or naked and minutely granulated. *G. parisiense β. anglicum* WB. ii. 184; eorund. *γ divaricatum* (excl. syn.). *G. parisiense* b. Vill. Dauph. l. c. *G. parisiense a nudum* Gr. et Godr. ii. 42. *G. parisiense* Lam. Enc. ii. 584; Bab. 157. *G. anglicum* Huds. EB. t. 384; Sm. E. Fl. i. 209; DC. iv. 607; Seub. Fl. Az. 34. "*G. anglicum α* Koch (ed. 1) 354;" Coss. et Germ. Fl. Par. ii. 363; eorund. var. *β. erectum* (excl. syn.)? *G. minutiflorum* Holl! Mad. List (not Brot.). *Aparine minima* Ray Syn. 225. t. 9. f. 1.—Herb. ann. Mad. reg. 1, 2, 3, c; PS. reg. 3, 4, rr. On walls about Funchal, dry rocky banks in ravines, open mountain pastures, &c., in Mad. everywhere. In PS. on the rocky summit of P. do Facho, N. side of P. da Cabrita and rocks above the church of N. S. da Graça. May–July.—A small inconspicuous shortlived fragile delicate smooth pl., with slender brittle st. mostly 3–6 and rarely more than 8–10 in. long, and small remotely whorled l. St. diffusely suberect sometimes procumbent one or many (often about 3) from the crown of the rather long fibrous root strongly aculeolate and clinging by the numerous deflexed prickles at their 4 angles, sometimes very finely filiform and capillary, but still much oftener erect than procumbent or ascending. L. reticulate rather dark gr., the lower 4- or 5-nate broader or obovate, acute, the upper mostly 7-nate narrower or finely linear and produced into a fine bristly point, the disk above and nerve beneath mostly sprinkled with a few forward-pointing setules like those of the

margins. Cymes on erecto-patent stalks or short side-branches exactly as in *G. aparine* L. but 4–10-fld. and 2–3-compound, the divisions finely capillary and sprinkled with a few very minute prickles, 3–2-forked, the ultimate division with a single leaf or br. as long or sometimes twice as long as the quite smooth divaricate or often in fr. deflexed $1\frac{1}{2}$–3 millim. long, mostly binate pedicels. Fl. reddish or purplish outside, very small, pet. not longer than the ov. not apiculate, scarcely spreading. Fr. notched, transversely reniform, $\frac{1}{2}$–$\frac{3}{4}$ millim. long, $\frac{3}{4}$–1 millim. broad; mericarps globosely oval, mostly quite free from all trace of pubescence but finely granulated.

Two opposite extreme forms or states of this plant occur occasionally, equally diverging from the normal type. In hot sunny situations or open hill-sides and mountain pastures, it becomes more robust, with shorter stouter st., more crowded whorls of l. and close congested cymes of fl. and fr., turning very black in drying, and when growing on exposed flat tops of walls or rocks with numerous procumbent st. radiating from the crown of the root. On the other hand, in holes or crevices of walls or rocks, or when drawn up amongst other herbage in damp and shady spots, it assumes a very different aspect, becoming excessively attenuated and delicate in all its parts with erect often unbranched single st. of extreme tenuity not thicker than a hair, long internodes, finer or thinner l. in remote whorls, and loosely divaricate cymes with more elongated spreading pedicels and branches; and the whole pl. also turns less black or sometimes not at all so in drying. Such spec. in the Canaries were considered by Webb l. c. to be identical with *G. divaricatum* Lam. Dict. ii. 580 (DC. Ic. Pl. Rar. Gall. t. 24); which however, notwithstanding the adverse opinions of Smith E. Fl. l. c., Koch (ed. 2) 1025, and Cosson and Germain Fl. Par. ii. 364, appears to be sufficiently distinct. Indeed Cosson and Germain's *G. anglicum* β *erectum*, with st. "fortement denticulées-scabres," agrees thus far as exactly with this form of the Mad. *G. parisiense* L. β as it differs from the true *G. divaricatum* Lam.

Holl and Reichenbach's reference (Mad. List) of this delicate form of the Mad. pl. to *G. minutiflorum* Brot. is doubtless incorrect; for Brotero's pl. belongs by its "hispid fr." rather to *G. parisiense* L. α *trichocarpum* Tausch (*G. litigiosum* DC.),

a pl. which has never occurred in Mad. though it is not uncommon in the Canaries. However I am fortunately enabled to refer Holl's pl. with certainty as above to my *G. parisiense* β by possession of a sp. from its collector himself, gathered near Camera de Lobos in July 1827.

G. anglicum β *parvifolium* DC. l. c. seems to be merely a depauperated state from drought, with short stoutish stunted erect st. 2–3 in. high and crowded whorls of l., which occurs very commonly amongst the short turf in dry burnt-up mountain pastures in Mad.

Linnæus, by quoting Ray t. 9. f. 1, seems to have intended to include β *leiocarpum* under his *G. parisiense*, and I have quoted him accordingly.

4. G. APARINE L. *Raspa-lingua.* **Goose-grass or Cleavers.**

St. villose at the joints succulent stout but weak and rampant climbing or clinging tenaciously by the copious reflexed prickles of their angles and of the keel or nerve beneath and margins of the rough punctate-hispid subspathulately oblongo-lanceolate or linear-lanceolate abruptly aristate or mucronate 6–8-nate l.; cymes depauperate few- (2 or 3–6-) fld. stalked verticillately leafy subpaniculate in fr.; fr.-stalks divaricated straight; fr. uncinately-setose rather large—Linn. Sp. 157; Desf. i. 130; Brot. i. 151; EB. t. 816; Sm. E. Fl. i. 210; Buch 195. no. 279; DC. iv. 608; WB. ii. 183 (excl. varr. β, γ); Koch 362; Seub. Fl. Az. 34; Bab. 157. "*Valantia aparine* β Lam. Fl. Fr. iii. 383" (ex DC.).—Herb. ann. Mad. reg. 1, 2, c. Banks and bramble hedges about Funchal in vineyards up the Rib. de S^{ta} Luzia, cornfields along the Caniço road, Loo fields &c., and Chestnut woods at S. Vicente, general. March–June.—Bright full gr. with brittle juicy elongated straggling 4-angular branched st., 2–4 ft. long mostly villose above the joints, clinging to everything it touches by the hooked prickles or bristles of its st. and of the l. and fr., flaccid and fast withering. L. often 7-nate mostly broadish all over rough with short erect hooked forward-pointing bristles, the stronger prickles of their keel and margins pointing backwards except near their tips. Cymes reduced to mostly 2 or 3 axillary fl. from the upper whorls of the short side-branches, not more than once or twice forked and furnished with whorls of 5 or 6 (not merely 1 or 2) floral l. at their divisions. Pedic. short, straight and stiffly divaricate in fr. Fl. very small pure w. not gr. or buff. Fr. large 4–5 millim. in diam. densely hispid, a double globe, one seed or globe often abortive.

The expressed juice of the pl. is sometimes drank remedially

in England as an antiscorbutic. The seeds have been recommended as a substitute for Coffee. No use whatever is made of the pl. in Mad.

The nearly allied *G. spurium* L. (EB. t. 1871) "distinguished by its" less depauperated cymes of "more numerous" (3–9) "gr. fl., floral l. solitary ('or in pairs'), fr. of about half the size and smooth" Bab. (or in β. *G. Vaillantii* DC.= *G. Vaillantii* EBS. t. 2943, hispid) has not occurred either in Mad. or the Can.

b. Cymes depauperated reduced to 2–3-fld. axillary ped. shorter than the l. or to 1–3 one-fld. pedic.; not panicled.

†5. G. TRICORNE With.

St. procumbent nearly simple stout but weak and straggling, the angles very rough or armed like the keel and margins of the 6–8-nate linear-lanceolate smooth l. with numerous strong reflexed prickles; ped. axillary short erecto-patent mostly 3–5-fld., pedic. strongly recurved in fr.; fl. small w., the 2 side-fl. perfect but seldom both fertile; fr. dark brown mostly binate large drooping finely and sharply tuberculated smooth, mericarps globose scarcely combined, one mostly abortive.—With. Brit. Pl. (ed. 2) 153 (ex Sm.); EB. t. 1641; Sm. E. Fl. i. 205; DC. iv. 608; Koch 362; WB. ii. 182; Bab. 156. *G. spurium* Roth Tent. i. 66 (ex Koch) (not Linn.). *Valantia tricornis* Roth Neu. Beytr. i. 142 (ex DC.). *Val. triflora* Lam. (ex DC.). *Val. spuria* Pers. Syn. 129.—Herb. ann. PS. reg. 2, rrr. "Cornfields at the base of the Pico do Castello," Barão do Castello de Paiva, Febr. 1859.—St. 1–2 ft. long, with a few short branches only towards the base, smooth like the l. but strongly and copiously prickly at the angles as also are the ped. and pedic. L. narrow 6–8 lines long, 1–1½ wide; gradually aristate or cuspidate, their margins and keel strongly and often doubly aculeolate. Ped. shorter than the l. sometimes twice 2–3-fid; pedic. strongly recurved in fr. 1–3-nate mostly binate. Fr. coffee-brown or blackish, mericarps nearly distinct or slightly combined, globose, 3 millim. in diam., bald or naked but thickly covered with minute subacute abrupt tubercles.

The ped. are axillary on the main st. or on the short side-branches. In the latter case especially the inflorescence is nearly that of *G. aparine* L.

Described from dried PS. spec. kindly communicated by my indefatigable friend the Barão do Castello de Paiva. I never met

with it either in PS. or Mad. In the Canaries it is an abundant weed in cornfields.

6. G. SACCHARATUM All. *Raspa-lingua.*

St. procumbent numerously branched at the base smooth, the angles slightly rough with a few feeble minute reflexed prickles; l. 6-nate lanceolate abruptly aristate or mucronate smooth, their margins serrulato-ciliate with small forward-pointing spinules; ped. axillary short 3-fld., recurved in fr.; fl. small cream-col., the 2 side-fl. imperfect sterile; fr. solitary large drooping w. or cream-col. finally light brown coarsely granulate or warted smooth; mericarps globose scarcely combined, one mostly abortive.—"All. Ped. no. 39;" DC. iv. 607; WB. ii. 182; Koch 362; Bab. 156. *G. verrucosum* Sm. in EB. t. 2173; Fl. Gr. t. 133; Sm. E. Fl. i. 204. *Valantia aparine* L. Sp. 1491; Pers. Syn. 129; Desf. ii. 390; Brot. i. 207; Buch 195. no. 282. *V. aparine a* Lam. ex DC.—Herb. ann. Mad. reg. 1, 2, 3, ccc; PS. reg. 2, r. Waste ground in vineyards, by road-sides, on walls and in cornfields in Mad. everywhere; in PS. only in the Serra de Fora. Dec.–June principally, but almost at all seasons.—Whole pl. smooth and shining, rather dark full gr. St. branching numerously from near the root, stout and simple upwards, procumbent or ascending 6–12 in. long. Ped. solitary thickish shorter than the l. strongly recurved or deflexed in fr. Fl. minute, the 2 lateral male barren fl. shortly stalked opposite. The strikingly large and handsome drooping pyramidally warted or tuberculated cream-col. or whitish fr., each mericarp of which is 3 millim. in diam. and coarsely granulated like a sugared almond, marks out at once the species, which is further easily distinguished from *G. tricorne* by the forward-pointing marginal spinules of the l.

7. G. GEMINIFLORUM Lowe.

Nearly smooth or but slightly hispidulous dwarfish; st. short erect or subdiffuse slender filiform or capillary divaricately fork-branched from the base and especially upwards, nearly smooth or glabrescent, the four angles here and there with a few remote minute reflexed spinules; l. 4–6-nate subpetiolate elliptic-obovate aristato-cuspidate spreading or deflexed, their margins ciliate and upper surface often rough with forward-pointing setules; pedic. smooth axillary, either in pairs or single at each whorl and shorter than the l., or binate on a once-forked 1-leafed ped. and longer than the l., in fr. divaricate or sometimes recurved; fl. w. very small; fr. small densely hirsute or uncinately setose.—Novit. 541 or 19.—Herb. ann. PS. reg. 4, r. North side of the rocky summit of Pico do Facho and on Pico do Castello (often intermixed with *Aspera muralis* (L.)); abundant in the clefts of rocks and mountain

turf, as also on the walls of the old ruined Fort on P. do Castello more robust and luxuriant. Apr.–June.—A small inconspicuous extremely delicate and fragile short-lived pl., growing subcespitosely amongst the short fine mountain turf or filling crevices of rocks. Root very small and slender. St. 2–4 in. long, rarely 5 or 6 in. and then more spreading or diffuse, repeatedly and regularly dichotomously branched from the base upwards, extremely fine and brittle shining smooth remotely and sparingly aculeolate. L. small thin and delicate not reticulate remarkably broad and short, 2–4 millim. long, 1–2 broad, the lowest roundish oval, all conspicuously and abruptly aristate at the tip and attenuated at the base into a more or less distinct petiole, dark gr., turning rather black in drying. Fl. sometimes single but mostly two together each on its own axillary pedic. 1–3 millim. long, rarely depauperato-cymose i. e. elevated singly or in pairs on a common 1-leafed ped. and then a little longer than the l. (in other words, cymes bifid stalked 1-foliate 2-fld.), and especially in more robust luxuriant pl., by the shortening or abortion of the upper internodes or branches, congested into little dense leafy 3–6-fld. terminal glomerules or heads, but still properly and truly axillary and in no sense paniculate. Pedic. from once to twice the diam. of the fr. in length, in fr. divaricate and sometimes reflexed; but the ped., when there is any, always straight and erect: both are quite smooth and unarmed. Fr. 1–1½ millim. in diam. globose or a little transversely oval, thickly clothed with rather coarse brownish-grey strongly hooked setæ, equalling or rather exceeding in length its own semidiam., brownish and thickened downwards.

This elegant little pl. comes nearest to *G. recurvum* Req. in DC. iv. 609, but disagrees with the description l. c. in its erect or diffusely suberect regularly dichotomous st., mostly geminate pedic. or sometimes 2- (but never 3-) fld. ped., the former never hirsute and only rarely deflexed in fr. It also approaches *G. minutulum* Jord.

Another apparently undescribed sp., closely allied to the preceding as well as to *G. recurvum* Req., found by myself in Febr. 1864 abundantly a little below the summit of Monte Gordo in the island of Sao Nicolao, one of the Cape Verdes, and again, 1866, in Fogo another of the group on the Chao da Relva at the foot of the great Volcanic Cone, at an elevation of 6000 or 8000 ft., may be thus characterized:

G. intricatum Lowe: annuum puberulum glabrescens, caulibus numerosis gracilibus tenuissimis capillaribus basi intricato-ramosis subcespitosis superne simplicibus elongato-prostratis v. procumbentibus retrorsum minutissime setuloso-spinulosis v. acu-

leolatis; fol. 6-natis linearibus v. lineari-lanceolatis cuspidatis patentibus v. subrecurvis glabriusculis serrulatim ciliato-setulosis; cymis axillaribus ad dichotomiam unifoliatis 2–4-floris foliis verticillorum longioribus pedicellisque 1–2-natis 1-floris iisdem brevioribus setuloso-subpuberulis patentibus v. reflexis; fl. minutis albidis; fr. minutis breviter nec dense (sæpe sparsim) uncinato-hispidulis globosis.

Hab. in montibus Insularum Viridensium ad alt. 6000-8000 ped.

A Cape Verde spec. of this plant exists in Herb. Mus. Paris., brought from Lisbon in 1808 by M. Geoffr. de St. Hilaire, and marked "(Aspera) *Galium filiforme* R. et S.?" It is without fl. or fr., and was therefore probably either purposely omitted or overlooked by Webb in his *Spicilegia Fl. Gorg.* Nor is there any mention of the pl. in J. A. Schmidt's *Flora der Cap. Verd. Inseln.*—*G. filiforme* R. and S. is a mere syn. of *Aspera muralis* (L.).

5. Aspera Mnch.

1. A. muralis (L.).

Sherardia muralis Linn. Sp. 149; Pers. Syn. 124. *Scherardia muralis* Brot. i. 153. *Aspera nutans* "Mœnch. Meth. 641." *Callipeltis muralis* Moris. Sard. ii. 309. *Galium murale* DC. iv. 610; Koch 1025; WB. ii. 181; Gren. et Godr. ii. 46. *Valantia filiformis* Ait.! Hort. Kew. (ed. 1) iii. 428. *Galium filiforme* DC. iv. 610. *Asperula verticillata muralis* Moris. § 9. t. 21. f. 6.—Herb. ann. PS. reg. 4, r; SD. reg. 2, r. In PS. on the N. side of most of the rocky peaks; P. do Castello, in the short fine turf, intermixed abundantly with *G. geminiflorum* Lowe (as in the Canaries usually with *G. parisiense* L. *a*); SD. at the top. Apr.–June.—A small inconspicuous pl. of a light or y.-gr., not turning black in drying, otherwise of much the same aspect or habit as *G. geminiflorum* or *G. parisiense*, but at once distinguished by the curious horn-like fr. which remains strongly attached to the st. even when the latter are dried up. St. slender often filiform sparingly or irregularly branched dichotomously, 2–4 or 5 in. long, decumbent, often subcespitose, more or less hispid and here and there subaculeolate with deflexed prickles. Lower and middle l. 4–6-nate, uppermost 2–3-nate, the middle more broadly the uppermost more narrowly elliptic-lanceolate, the lowest obovate and subpetiolate, all cuspidate or aristate, setuloso-ciliate at the margins and with the whole upper surface hispid or glabrescent. Pedic. 1–3 mostly 2, geminate or opposite, axillary, each 1-fld., or 2–3-nate on an axillary dichotomous ped. often furnished at the fork with a single l. or br., the whole with the fr. in either case very much shorter than the l., the pedic. about half the length of the fr., stout and in fr. strongly deflexed. Fr. drooping linear-oblong 1–1½ millim. long, not quite half as broad,

black but hoary and shaggy or hirsute all over or at the tip with long w. hooked bristles, at first straight, finally subincurved or horn-like.

I did not meet with Dr. J. A. Schmidt's *G. filiforme* (Fl. Cap. Verd. 209) in the Cape Verdes, and therefore cannot speak with absolute certainty about it: but judging from numerous Mad. and Can. spec. I cannot but agree with Webb in believing *Val. filiformis* Ait. and Chr. Smith's Laguna (Tenerife) pl. (*G. filiforme* DC.) to be both identical with *Sherardia muralis* L.; and I must further observe that Dr. J. A. Schmidt mentions no char. in his pl. at all at variance with the belief of its identity also with the same. The l. vary in Mad. spec. more or less linear-lanceolate or glabrous even on the same pl.

Aspera, however objectionable, is a less evil than a new name, and may be tolerated like *Asperula*, *Mirabilis*, *Impatiens* &c.

Valantia muralis L. and *V. hispida* L., both much resembling *A. muralis*, should be looked for in P^to^ S^to^ and the Desertas.

6. Rubia L.

1. R. angustifolia L. *Ruivinho.* **Madder.**

St. shrubby rampant climbing, the angles upwards very rough and harsh like the keel beneath and edges of the l. with strong minute hard reflexed points or prickles; l. evergreen persistent coriaceous very harsh and rigid shining not reticulate beneath 6–8-nate sessile linear or linear-lanceolate mostly 6–12 times as long as broad, the nerve and margins above mostly more or less rough with forward-leaning points besides the reflexed prickles of their keel beneath and edges; cymes on axillary short side-branches many-fld. trichotomous; fl. 5-fid, lobes ovate apiculate or acuminato-aristate; anthers subglobose, stigmas globose.—Linn. Mant. 39; Pers. Syn. 130; Brot. i. 154; Ait. Hort. Kew. (ed. 2) i. 243; DC. iv. 589. *R. peregrina γ angustifolia* WB. ii. 187; Gren. et Godr. ii. 13. *R. tinctorum* Buch 195. no. 280 (not Linn.).—Shr. per. Mad. reg. 3, cc. Woods and wooded banks in ravines everywhere (Rib. Frio, da Metade, Serra d'Agua &c.) especially in the north.—Apr.–Aug.—Roots long fibrous strong woody, often as thick as the little finger, running extensively but not deep below the surface, brown outside, dull red within. St. woody but flexible round naked simple and pale brown or ash-col. downwards and as thick as the little finger, running up bushes and underwood like thin ropes or cords often to the height of 10 or 15 ft., much branched upwards and clinging and supporting them-

selves by their cumbrous dense festoons of matted branches and foliage which are of a peculiarly dark bright-shining gr. and harsh stiff dry rigid nature, clinging as tenaciously in masses together or to the shrubs they overspread as *G. aparine* L. L. persistent or perennial very harsh stiff and rigid, 1–3 in. long, 1–3 lines broad or 3½–18 (but mostly 6–12) times as long as broad, the upper often nearly altogether smooth or with only a few very minute rough points inclining backwards on the keel and edge beneath, the nerve above and whole upper surface being quite smooth; but the rest of the l. have not only the keel beneath and edges harshly retroscabrous with a single row of larger distinct prickles but the nerve above and upper surface towards the margins also antrorsally scabrous more or less though sometimes nearly or quite smooth like the upper l. of the panicle. Fl. small very numerous in crowded lateral trichotomously compound cymes forming large oblong ample leafy panicles pale greenish-y. or cream-colour and strong-scented, 5-fid; lobes acuminato-apiculate or long-pointed. Anthers subglobose or shortly oval. Stigmas abruptly globose: styles distinct at least halfway down. Fr. shining black globose 3–3½ lines in diam. Pedic. divaricate in fr.

This pl. is as distinct from *R. peregrina* L. as most sp. of the tribe *Galieæ* are from one another.

Order XLV. VALERIANACEÆ.

The Valerian Family.

Fl. mostly perfect subirregular. Cal.-tube united with the ov., limb sup. various, toothed or entire, often obsolete or involute in fl. forming at last a crown or sometimes feathery *pappus* to the fr. Cor. tubular funnel-shaped 3–5-lobed, the lobes imbricate in bud, more or less unequal or irregular with the tube spurred or gibbous. Stam. 1–5 free inserted in the tube. Stigmas 1–3. Ov. 3-celled, one cell only perfect with a single pendulous ovule. Fr. dry indehiscent 1-seeded 1-celled or 3-celled with 2 cells barren, crowned with the persistent more or less developed cal.-limb. Albumen 0.—Herbs with bitter tonic antispasmodic or anthelmintic and strong-scented roots or rhizomes. L. *opposite without stip.* Fl. small cymose mostly red or w., often blue or lilac, very rarely y.

1. CENTRANTHUS. Cor. 4–5-lobed, tube spurred at the base or gibbous on the side or throat. Stam. 1. Fr. 1-celled crowned with the cal.-limb unrolled and developed into a feathery pappus.—Cymes corymbose.

2. VALERIANELLA. Cor. 5-lobed, tube regular not spurred

or gibbous. Stam. 3. Fr. 3-celled crowned with the erect persistent unequally toothed simple unchanged or only enlarged cal.-limb, 2 of the cells barren.—St. dichotomously branched; fl. at first solitary in their forks, becoming aggregate in close bracteated cymes or fascicles at their top.

1. CENTRANTHUS DC.

††1. C. RUBER (L.). **Red Valerian.**

L. ovate or ovate-lanceolate; spur distinct basal, twice as long as ov., shorter than the tube of cor.—DC. iv. 632; Koch 371; Bab. 160. *Valeriana rubra a* Linn. Sp. 44. *V. rubra* Desf. i. 27; Brot. i. 47; EB. t. 1531; Sm. E. Fl. 142. *V. marina latifolia* Moris. iii. § 7. t. 14. f. 15; ejusd. Pl. Umbell. t. 11.—Herb. per. Mad. reg. 1, 2, c. Walls and rocks about Funchal chiefly, an outcast of gardens. At most seasons.—More or less glaucous smooth 1–2 ft. high thickly bushy and leafy. St. suffrutescent at the base, succulent and fistulose upwards. L. all entire more or less stalked, the upper lanceolate. Cymes brachiate forming close pyramidal terminal thyrses or panicles. Fl. more or less deep rose-red, sometimes pale pink or w. Style filiform and with the single stamen somewhat exserted. The remarkably long slender spur originates from the very base of the tube of cor. Lobes of cor. very unequal and often arranged bilabiately $\frac{4}{1}$. Expanded pappus large, elegantly feathery, deciduous.

2. C. CALCITRAPA (L.).

Lower l. lyrate, lowest often simple ovate or rounded, upper lyrato-pinnatifid, lobes of upper sharply of lower bluntly toothed or crenate; spur very short from above the base of cor.-tube.—DC. iv. 632 (excl. var. *β*); Buch 195. n. 276; WB. ii. 196; Bab. 160; Gren. et Godr. ii. 53. *Valeriana calcitrapa* L. Sp. 44; Desf. i. 28; Brot. i. 47; Fl. Gr. i. t. 30.—Herb. ann. Mad. reg. 2, 3, 4, c. Rocks and banks in ravines up to the highest peaks; Rib. de S^{ta} Luzia &c., Peaks about the Icehouse, at the Entrosa on the N. coast, P^{co} da Cruz, Seixal, &c. March–June.—Whole pl. smooth and shining succulent, very variable in stature and luxuriance, with a single very erect straight st. from 2 in. to 2 ft. high, mostly about 1 ft., stout succulent hollow and sometimes as thick as the little finger, mostly glaucescent, brachiately branched. L. succulent more or less glaucescent, often dark purplish red or violet; lobes of lower and st.-l. toothed or crenate, of uppermost often entire. Fl. pale greyish lilac or dull w. distichous but unilaterally erect close-crowded on the uppermost divisions of the brachiate dichotomous densely corymbose terminal cymes, each fl. from the

axil of a persistent linear-lanceolate br. as long as or longer than itself. Spur very short, but not a mere gibbosity, originating a little above the base of the tube, but not $\frac{1}{4}$ of the way up, and far below the throat. Stam. a little longer than cor. Lobes of cor. subequal.

The exact position of the spur seems variable. Grenier and Godron say "Cor. très brèvement gibbeuse sous la gorge." Webb says "tubo medio vel versus basim calcarato;" Desfontaines, "basi hinc gibboso," as in the Mad. pl.

2. Valerianella Poll.

§ 1. Locusta DC. *Fr. with 2 contiguous parallel subconfluent barren cells larger than the fertile cell which is gibbous thickened and corky at the back. Dissepiment of barren cells incomplete or obliterated.*

1. V. olitoria Poll. *Saboia* or *Alface da terra.* **Corn Salad or Lambs Lettuce.**

Branched dichotomously from the base, mostly bushy; st. and branches more or less furry or deflexedly pubescent at the angles; l. softly ciliate at least downwards, undivided, the lower oblong-spathulate obtuse entire, the upper narrower less obtuse and slightly or irregularly repand-toothed; fl. aggregate in small subglobose heads or close congested cymes with leafy ligulate spreading serrulato-ciliate involucral br.; fr. large oblique ovately or rhomboidally roundish, compressed, transversely or circularly ribbed, crowned with one distinct tooth and 2–4 shorter indistinct teeth.—DC. iv. 625; WB.! ii. 195; Koch 372; Bab. 161; Gren. et Godr. ii. 58.—*Valeriana olitoria* Brot. i. 48. *Valeriana Locusta* Sm. EB. t. 811; Ait. Hort. Kew. (ed. 2) i. 76; Buch 195. no. 275. *Valeriana Locusta a. olitoria* Linn. Sp. 47; Desf. i. 30 (var. A). *Fedia olitoria* "Vahl Enum. ii. 19;" Hook. Fl. Sc. i. 15; Sm. E. Fl. i. 45.—Herb. ann. Mad. reg. 2, cc. Banks, walls and cornfields in the north general; P.° da Cruz, Rib. de Fayal up to the Pao de Bastião, S. Vicente, Seixal on road to Rib. Fundo, &c. Apr.–Aug.—St. numerous branching from the root, 6–12 in. high, forming mostly a dwarf corymbose bushy tuft of a peculiar pale apple-gr. and more or less hirto-pubescent or furry downwards at the angles, upwards nearly or quite smooth. L. sometimes all entire or all feebly repand-toothed, remarkably flaccid and quickly withering, their edges and midrib ciliato-pubescent. Fl. pale blue in terminal stalked bracteated subglobose heads, not sessile singly in the angles of the st., the leafy outer br. resembling an involucre. Fr. mostly quite smooth

in Mad., rarely minutely velvety-puberulous, pale straw-colour, $\frac{1}{10}$ in. in transverse diam., often rather broader than long, gibbous, compressed, the blunt narrow edge or back longitudinally faintly grooved, the broad flattened or slightly hollow sides with two faint approximate medial ribs separated by a narrow groove, and one much stronger than the other; the whole fr. more or less strongly ribbed or wrinkled circularly. Cut across, the fertile cell with its enormously gibbous spongy back is found lying across from side to side and occupying more than half the fr.; the 2 barren cells lying parallel at right angles to it and with the wall between them imperfect or more or less obliterated. Teeth of crown very short, thickened, gr. at the tips even in the ripe fr., the larger one belonging to the fertile cell, the 2–4 (or mostly 2 only tolerably distinct) smaller teeth being the tips of the outer ribs or nerves of the 2 barren cells. Not used in Mad. for anything but fodder.

§ 2. SIPHONOCŒLÆ Willem. *Fr. with two distinct or separate and non-contiguous barren cells convergent at the base and smaller than the fertile cell which is not thickened at the back. Dissepiment of barren cells complete.*

2. V. MORISONI DC.

St. widely divaricate or *fork-branched upwards*, branches of corymb spreading, the ultimate divisions *spinuloso-scabrous fine and slender*; upper l. subpinnatifidly 2–3-toothed at the base, the rest entire; cymes small *not many-fld. or congested*, forming a widely forked lax corymb; br. erect linear *finely serrulato-ciliate* scarcely longer than the fr.; fr. smooth or hirsute *small ovate-acuminate* or *conico-pyramidal compressed*, the back convex with a fine filiform midrib and 2 stronger side-ribs, the front with two siphon-like strong ribs (barren cells) inclosing an *oblong or lanceolate-oblong* slightly convex nucleus-like depression divided into two equal parts by a filiform keel or midrib: crown or cal.-limb *prominent narrow half the length of fr.* very obliquely truncate 5–6-*toothed*, the middle dorsal tooth *produced acuminate.*—*V. Morisonii* DC. iv. 627; Soyer-Will. in Gren. et Godr. Fl. Fr. ii. 63. *V. dentata* "(Poll. Palat. i. p. 30)"; Koch 372 (excl. syn. *Valeriana Locusta* δ. *dentata* L.) not DC.; Coss. et Germ. Fl. Par. ii. 369; Bab. 161.—Herb. ann. Mad. reg. 2. Apr.–July.—Varr.:—

a. leiocarpa; fr. smooth or naked; br. mostly indistinctly serrulate or ciliate, sometimes entire.—WB. ii. 194 (not *a* DC.). *V. Morisonii* β. *leiocarpa* DC. l. c. *V. dentata a. leiocarpa* Koch l. c. *Valeriana dentata* EB. t. 1370; Ait. Hort. Kew. (ed. 2) i. 76. *Fedia dentata* Hook. Fl. Scot. i. 15; Sm. E. Fl. i. 45. *F. dentata a* Hook. Brit. Fl. (ed. 5) i. 164.—S. Vicente in cornfields along the road halfway up to the Encumeada (first

found by Dr. Chas. Lemann) and on walls above D^a Vicenzia's Quinta, rrr.

β. lasiocarpa; fr. crispate-hispid or hirsute; br. distinctly serrulate or ciliate.—*V. Morisonii* DC. l. c. (excl. syn. Sow. EB. t. 1370 and var. *β*). *V. dentata β. lasiocarpa* Koch l. c. *V. dentata β. pubescens* Cosson et Germ. l. c. *Fedia dentata β* Hook. Brit. Fl. (ed. 5) i. 64. *Valeriana mixta* Linn. Sp. 48. "*Fedia mixta* Vahl En. 2. 21." *Valerianella semine umbilicato minore hirsuto* Moris. Umbell. tab. gen. ff. 56 et 57; Hist. iii. sect. 7. t. 16. f. 35.—S. Vicente in cornfields mixed with *α* on the road to the Encumeada; also on the road to the Forno de Cal, S^r Moniz, rrr.

Light gr. smooth without pubescence 9–18 in. high widely branched dichotomously upwards only, the upper branches especially of the cymes fine and slender angular but not winged, scabrous with a few minute subrecurved spinules at the angles. L. narrow, the upper ligulate or linear acuminate and pectinately inciso-toothed or laciniately subpinnatifid at the base only, the rest entire and more or less acute. Corymb loose widely divaricate, the fl. loose and few together (instead of congested) in remote small cymes, with a single fl. in the forks; the branchlets and pedicels slender, simple fine not winged or thickened. Fl. "flesh-col." Hooker l. c. Fr. (with beak or crown) 2–2½ mill. long, 1 mill. broad; coppery or reddish brown; the dorsal midrib or stria often faint or obsolete and in any case not visible in *β*; the hairs incurved or crispate. Crown or cal.-limb erect distinct green and foliaceous not reticulate much narrower than fr. mostly ½-toothed, the middle dorsal tooth produced acuminate 3-dentate with a short but distinct toothlet on each side, the 2 or 3 front teeth short irregular or more obscure.

The var. *β* is, according to Soyer-Willemet in Grenier and Godron, *Valeriana mixta* L. But the names *mixta* and *dentata* have been so variously applied by different authors that it is far better to set them both aside; e. g. *V. mixta* DC., Bertol., Guss. = *V. microcarpa* Loisel., and the true *V. Locusta δ. dentata* L. = *C. auricula* DC. and not at all the present pl.

3. V. RUBERULA (Bertol.).

St. branched *mostly from the base* and leafy; branches of corymb stiffly many-forked, the ultimate divisions *short stout robust strongly alato-angular and thickened or dilated upwards smooth and even*; l. mostly repand-toothed, the upper rarely pinnatifid or 2–3-inciso-toothed at the base; cymes *close compact congested many-fld.* forming a broad stiffly many-forked

corymb; br. erect or adpressed linear or lanceolate often dilated at the base *very entire not ciliate* a little longer than the fr.; fr. *minute* very shortly and adpressedly hispid *globosely ovate* scarcely or not compressed, the back convex with a keel or midrib sometimes obsolete and 2 sharp side-ribs, the front with 2 siphon-like strong blunt ribs inclosing a *short or roundish oval* slightly convex nucleus-like depression like an umbilicus and with a keel or midrib which is often faint or obsolete; crown very *short and inconspicuous mostly entire* obliquely truncate not ciliate, the dorsal tooth *short and broadly ovate* mostly obtuse and apiculate or mucronate, sometimes acute, the inclosed cuplike hollow area roundish oval.—DC. iv. 627; Koch (sub *V. dentata* β) 373; Gren. et Godr. Fl. Fr. ii. 62.—Herb. ann. Mad. reg. 1–2, r. "Rib. de João Gomes, Funchal, and S. Vicente on the road to the Forno de cal," S^r^ Moniz; between Seixal and the Rib. de João Delgada along the cliff road to the east, and very abundantly towards Rib. Fundo to the west, in cornfields intermixed with *V. olitoria* Poll.; P^to^ da Cruz, Terra de João Bautista, sparingly; in a sugar-cane plantation close behind the Church of Agua da Pêna between S^ta^ Cruz and Machico, abundant. Apr.–July.—Light gr. nearly or quite smooth. St. 6–9 in. high leafy mostly bushy and branched from the base, the branches opposite and rising as high as the main st., in weaker pl. simple and branched only upwards; st. and branches thicker stouter and stiffer than in *V. Morisoni*, smooth or with only a few minute short furfuraceous hairs or setules here and there in their grooves or hollows. Branches of corymb repeatedly dichotomous stiffly divaricate, the ultimate and penultimate divisions of the cymes abbreviate robust and thickened with the edges or angles alato-marginate; all quite smooth and even. Br. small not much longer than the fr. erect or erecto-patent narrow and acute mostly dilated and calyculate-amplexicaul at the base, with membranous w. margins, quite smooth and entire. Fl. minute in small distinct close terminal forked cymes or heads opening in rows regularly outwards, pink in bud, afterwards appearing in the mass pale lilac or bluish; a solitary fl. in the axils of the uppermost forks only of the corymb. Fr. 1–1½ millim. long, ¾ mill. broad, coppery or reddish brown, much smaller shorter and plumper than in *V. Morisoni* DC., not acuminate or beaked and with a short oval not oblong depression in front more like an umbilicus, minutely rough or adpressedly hispid with very short erect setules, rarely nearly smooth or naked and merely reticulato-granulate, and then only a few such on the same pl. with others hispid. Crown gr. erect scarcely more than ¼–⅓ the length of the fr., much broader and shorter than in *V. Morisoni* DC., only a little narrower than the widest part of the fr. and scarcely longer than broad, the single dorsal lobe or

tooth shortly and broadly ovate with a small abrupt point, smooth not reticulate or ciliate; the other teeth mostly undeveloped except the two terminating at top the 2 very strong siphonal pale ribs (barren cells) in front.

4. V. BRACTEATA Lowe.

St. *rather tall and stout* not bushy fork-branched upwards, deflexedly puberulous at the angles; corymbs small scarcely more than 2–3-forked with a pair of *long ligulate spreading leafy br. at each fork as long as or longer* than the slender filiform retro-puberulous branches and ciliato-connate at the base; l. spathulate or oblong-spathulate entire softly subciliate-pubescent downwards, the upper or br. sublaciniately or strongly but remotely and irregularly inciso-toothed; cymes small *conspicuously bracteate*, fl.-bracts *longer than the fr. or fl.* smooth mostly not ciliate or serrulate entire linear-lanceolate leafy loosely erecto-patent; fr. exactly as in *V. puberula* DC. but with the crown a little more developed and acute.—Herb. ann. Mad. reg. 2, rrr. P^to^ da Cruz in cultivated ground about the house and Yam-beds above it at the Sitio do Barreiro, sparingly. Apr., May.—Taller and larger than the preceding sp. with robust st. 12–18 in. high simple and not usually branched from the base, fork-branched upwards only, not bushy, of a pale gr., leafy, with conspicuous numerous long erecto-patent br. connate in pairs at the forks of the corymb and cymes, turning like the fl.-br. waxy-yellowish in drying and giving the inflorescence in the dried pl. something of the look of a *Euphorbia*. St. subpubescent on the ribs or angles; edges and midribs of the l. beneath minutely ciliato-pubescent; br. ciliate at the base only. Branches of corymb slender subelongate as in *V. Morisoni* DC., the ultimate divisions not stiffly divaricate short thickened and congested as in *V. puberula* DC. Upper l. or br. almost laciniate-toothed. Fl. w. or very pale lilac. Fl.-br. without or with very narrow membranous edges, mostly quite entire, rarely a little serrulato-ciliate towards the tips. Fr. not fully mature in spec., but differing neither in size nor any other essential point from that of *V. puberula* DC.

With the fr. almost exactly of *V. puberula* DC., this pl. has the taller habit and lax slender-branched corymbs or cymes of *V. Morisoni* DC., differing remarkably from both in its copious long leafy br. It may very possibly prove to be merely a large luxuriant drawn-up state or early stage of *V. puberula* DC. But at present without further study it can neither be reduced to that nor any other sp. From *V. microcarpa* Lois. it differs *prima facie* in its shortly hispidulous fr. not "couvert de poils

arqués un peu étalés et assez longs" (Gren. et Godr. ii. 62) and by the non-ciliate crown of its fr., &c.

Order XLVI. DIPSACACEÆ.

The Teasel Family.

Fl. compound formed of many perfect subirregular florets aggregate in heads on a common recept. with a common many-leaved involucre; *each fl. inclosed in a free persistent cup-shaped or turbinate foveolate or strongly ribbed special involucel or outer cal.* surrounding but not adhering to the fr. and mostly with a bractlet (chaff or scale) outside at its base. Cal.-tube united *partly or at top only* to the ov., contracted upwards into a narrow neck and then expanding abruptly into a cup-shaped and entire or toothed or setoso-pappiform limb. Cor. inserted at top of cal.-tube tubular funnel-shaped unequally 4–5-fid, lobes unequal *imbricate in bud.* Stam. 4 inserted on the cor.-tube alternate with the lobes; *anthers free distinct* 2-locular. Style filiform; stigma nearly or quite simple. Ov. 1-celled 1-ovulate; *ovule pendulous.* Fr. dry indehiscent 1-celled 1-seeded crowned by the scarious often pappose (setose or plumose) cal.-limb, the whole *inclosed by the persistent involucel.* Seed *erect with a fleshy albumen*, more or less but mostly only partly adherent to the cal.-tube. Embryo axile.—Herbs (rarely suffrutescent never milky) with heteromorphous opposite or verticillate exstipulate l. and thistle-like heads of small w. b. p. or purple fl. Inflorescence dimorphous: viz. centripetal in each head separately, centrifugal in them collectively in their order of succession on the pl.

1. DIPSACUS. Recept. with stiff acuminate spinous bractlets (chaffs or scales) shorter than the prickly spinous involucre. Involucels 4-gonal 8-sulcate shortly 4-toothed or entire. Limb of cal. cup-shaped subquadrangular, lobed or truncate ciliate. Cor. 4-fid. Stigma longitudinal simple or entire.—Herb. biennial with prickly st. and spinose heads.
2. SCABIOSA. Bractlets of recept. soft (leafy or chaffy) not stiffly spinous. Involucels cylindric deeply 8-grooved 4–8-pitted without awns, limb scarious campanulate or cup-shaped. Cal.-limb stipitate 5-awned in fr., awns spreading. Cor. 4–5-fid. Stigma notched.—Herb. perennial unarmed.

1. DIPSACUS L.

Teasel.

1. D. FEROX Loisel.

Dwarfish often nearly stemless or apparently scapigerous mostly 1–3-fld.; st. and ped. strongly and copiously prickly;

l. nearly all radical lanceolate-oblong or ligulate coarsely and unequally inciso-crenate or irregularly subpinnatifidly lobed or sinuate, subtomentoso-pubescent more or less prickly like the st. chiefly at the edges or on the midrib beneath; l. of involucre elongate linear-triquetrous very strong and rigid cuspidate or subulate and pungent prickly-echinate spreading longer than the short thick globose or globosely ovoidal heads; bractlets of recept. subulate-spinous thickly erecto-pubescent and setose, the tips smooth straight pungent, those at the apex of the heads produced.—Loisel Fl. Gall. (ed. 1) 719, (ed. 2, 1828) i. 102. t. 3; Spr. i. 377; DC. iv. 646; Reichenb. Ic. Fl. Germ. t. 706; Gren. et Godr. ii. 68.—Herb. per. PS. reg. 2, rr. Back of Pico do Facho and of P. Juliana in small Ribeiras; Serra de Dentro in the bed of the Rib. do Moledo. May, June.—Root large strong fleshy. Foliage very dark gr. Whole pl. not above 12 or 15 in. high. St. short or scarcely any, rarely more than 2–3-fld. often only 1-fld. and then scape-like and quite leafless. L. confined to the base of the pl. or with only one or two upwards on the st., about 6 in. long and ¾–1 in. broad, oblong and stalked or ligulate, very irregularly crenate and subpinnatifid or sinuate with few spathulate broad lobes, mostly fringed only at the edges or on the midrib beneath but sometimes sprinkled all over with strong pale straw-coloured prickles, stem-clasping and sometimes dilated at the base and all over thickly pubescent or subtomentose. Ped. long very stout and thick, strongly ribbed or angular, smoother than the rest of the pl. but still puberulous, copiously armed with numerous large pale brown or straw-col. deflexed prickles, often reduced to a radical 1-fld. scape. Fl. w. with a very pale tinge of blush; cor. thickly clothed outwardly with silky adpressed hairs, short and erect on the limb and throat, long and deflexed on the tube. Anthers bright purple or pink, linear. Stigma simple linear. Style and fil. smooth.

Reichenbach's fig. represents the seed-pappus as 4-angular or equally 4-lateral truncate and entire, instead of 4-fid or 4-partite as he figures it in his *D. laciniatus* L. t. 705. But my spec. are not sufficiently advanced to verify this point.

2. Scabiosa L.

Sect. 1. *Vidua* Coult. Tube of involucel 8-ribbed throughout from top to bottom, limb short *spongy inflexed*. Cal.-tube sheathed at base, limb narrow 5-setiferous *stipitate*.

††1. Scabiosa maritima L. *Saudades.*

St. sparingly and widely branched; radical l. oblong-spa-

thulate stalked cut or toothed, lower st.-l. lyrate, upper pectinately pinnatipartite with linear or lanceolate toothed or entire segments; ped. long and slender; heads in fr. ovoidal or oblong; fl. radiant 5-fid.—WB. ii. 199; Gr. et Godr. ii. 77.—Herb. ann. Mad.; PS., reg. 1, rr. Varr.:

a. pallidiflora; fl. pale mostly bluish pink or lilac cream-col. or w.—*S. maritima* L. Sp. Pl. 144; Pers. 120; DC. iv. 657. *S. atropurpurea* β, γ DC. l. c. *S. grandiflora* Desf. i. 123; Pers. 120. *S. columbaria* Buch 195. no. 274 (not Linn.).—Mad. Rocks on the W. side of the Rib. de João Gomes (Rochas da Pêna) half a mile above Funchal on a level with the Levada de S^{ta} Luzia. Apr.–June.

β. atropurpurea; fl. dark blood-purple.—*S. atropurpurea* L. Sp. Pl. 144, 145; BM. t. 247; Brot. i. 146; Pers. 121; DC. iv. 657 (excl. varr. β, γ). *Scabiosa peregrina rubra* Moris. Hist. iii. § 6. t. 14. f. 26.—Mad. in Sweet-potato (Batata) fields at the east end of the Levada de S^{ta} Luzia near the Mill. "PS. about the town in cultivated ground," J. M. Moniz. Aug.–Dec.

St. 1–3 feet high deflexedly pubescent. L. bright gr. smooth, the lower with petiole 2–4 in. long, the large terminal lobe 1–2 in. long. Ped. ribbed 6–12 in. long. Lfts. of invol. linear-lanceolate leafy gr. ciliate-pubescent as long as the lower fl., deflexed at least ultimately. Fl. fragrant, like honey, not less variable in size than colour. Anthers in β as dark as the fl. before bursting, then w. Pappus of 5 prominent tawny-y. rough erecto-setulose awns or bristles, its stalk (i. e. tube of cal.) inclosed halfway up in a loose ribbed sheath formed from the inner coat of the involucel.

There are no certain characters whatever to distinguish the two varr., which are therefore only retained for the clearer arrangement of the synonyms, β seeming to be more usually the result of cultivation, and *a* occurring in Mad. as in Tenerife (on the N. coast between S. Juan de la Rambla and Icod) more truly wild.

Sect. 2. *Sclerostemma* Koch. Tube of involucel 8-ribbed throughout, limb *membranous*. Cal.-limb *sessile* 5-setiferous.

2. S. Succisa L.

Rhizome abruptly truncate; l. elliptic-oblong or oblong-lanceolate undivided entire or faintly serrate; heads on long ped. hemispherical or in fr. globose, lfts. of inv. in 2–3 rows, scales or bractlets ciliate, involucel silky-hirsute 4-fid the teeth erect

herbaceous, cor. all equal regular subequally 4-fid.—Linn. Sp. 142; Brot. i. 145; Hook. Fl. Sc. i. 49; EB. t. 878; Sm. E. Fl. i. 194; DC. iv. 660; Gr. et Godr. ii. 81; Bab. 163. *Succisa pratensis* Mnch., Spr. i. 378; Koch 377.—Herb. per. Mad. reg. 3, r.

α. hirsuta (Wallr.) DC. l. c.; l. more or less hairy-pubescent. Linn. l. c. var. *β.*—Rib. de S. Jorge, upper part, in the bed of the ravine; Boa Ventura, peaks to the west at the Boca das Torrinhas and all down the upper wooded part of the valley; Head of Rib. de João Delgada; Rib. do Seixal, S^{r} Moniz. July–Sept.

β. glabrata (Wallr.) DC. l. c; l. quite smooth. Mountain-range to the east of the Portella in cleared open spots amongst thickets on or towards the tops of the higher peaks. Aug., Sept.—Rhizome dark brown or black strong præmorse or as if bitten off (whence the name *Succisa* or in English Devil's bit) with long stout whitish roots or fibres. St. about 2 or 3 ft. high ascending straggling or widely and sparingly branched upwards with a pair of connate l. at each division, hard and stiff, often v. or purple downwards, deflexo-pubescent. L. 5 or 6 in. long, 1–2 broad shining dark gr. with a conspicuous pale midrib and long petioles, stiffish or subcoriaceous, in *a* more or less sprinkled with hairs all over or at least ciliato-pubescent at the edges which in both *a* and *β* vary from serrate to entire. Heads of fl. numerous on long slender erecto-pubescent ped., $\frac{1}{2}$–$\frac{3}{4}$ in. in diam. Fl. scentless pale purplish bl. or lilac often nearly w. Cor. outwardly pubescent. Bractlets lanceolate gr. upwards and fringed with very distinct long cilia. Setæ or awns of pappus 5 rather short dark brown.

Order XLVII. COMPOSITACEÆ.

The Compound-flower or Daisy, Thistle and Dandelion Family.

Fl. compound, formed of several or many perfect or imperfect regular or irregular mostly tubular or ligulate rarely 2-labiate *florets* aggregate or closely crowded on a common *receptacle* (*clinanthium* Cass.) into a *head* (*calathidium* Cass., *capitulum* DC., *anthodium* Ehrh.) surrounded by a many-leaved *involucre* (*periclinium* Mirb., *common cal.* L.) formed of one or more rows of close erect *scales* (*phyllaries* or *bracts*). Cal.-tube *proper* of each flt. united *wholly* to the ov.; limb superior obsolete or developed in fr. into a scaly or chaffy, setose pilose or plumose crown (*pappus*). Flts. often with a scale-like membranous bractlet (*chaff* or *scale*, *palea*) at the base. Cor. gamopetalous superior inserted at top of cal.-tube, either tubular and regularly 4–5-fid or semitubular and irregularly

cleft ligulate or bilabiate, the divisions *valvate in bud*, and the 4–5 nerves of the tube corresponding with their sinuses. Stam. 5 inserted in the tube of cor.; filaments mostly free distinct jointed towards the top, rarely monadelphous; anthers linear erect *combined into a tube* (*syngenesious*) *embracing the style*, bursting inwards, with always an apical and mostly 2 basilary awn-like or tail-like appendages. Ov. 1-celled 1-ovulate, *ovule erect*. Style 1 mostly 2-fid, stigmas 2. Fr. a *cypsela* (*achænium* DC.) consisting of a single *erect seed without albumen*, coated with the dry indehiscent *altogether adherent cal.-tube*, crowned mostly with a distinct *pappus*. *Embryo* erect straight, the *radicle* inferior directed towards the *hilum*.

Mostly herbaceous or suffrutescent rarely arborescent erect rarely climbing pl. with bitter aromatic tonic or milky narcotic juices, found in all parts of the globe and constituting according to DC. about $\frac{1}{10}$ of its vegetation. L. without stip. never compound yet often compositisect mostly alternate sometimes opposite. Inflorescence dimorphous; general, (mostly corymbosely) cymose, centrifugal; partial i. e. of each particular head, centripetal. Fl. y. or w., more rarely red or purple, very rarely blue, seldom fragrant. Florets or *fl. proper* either all perfect (heads *homogamous*), or *heterogamous* the inner (of the *disk*) perfect and outer (of the *ray* or *margin*) imperfect (female or neuter), rarely variously *monœcious* or *diœcious*: all collected on a common *recept.* (*clinanthium* Cass.) or flat, conical or elongate torus-like top or apex of the ped. and expanding centripetally from the margin to the centre. When all the fl. are tubular the heads are called *discoid* or *flosculose* (e. g. *Artemisia*, *Carduus*); when all are strap-shaped, *ligulate* or *semiflosculose* (e. g. *Sonchus*, *Taraxacum*, *Lactuca*). When the fl. of the disk or centre are tubular and of the ray or margin ligulate, the fl. are termed *radiate* or rayed (e. g. *Bellis*, *Chrysanthemum*). The *recept.* is either in whole or part *chaffy* (*paleaceous*) or *scaly*—i. e. furnished with chaffy scales (*bractlets*) in continuation inwards of those of the involucre (bracts or phyllaries) and placed one at the outer base of each fl.,—or naked i. e. devoid of such chaffs or scales (bractlets) though often *fimbrilliferous* from the margin of the pits or cells, *alveolæ* or *areolæ* (obsolete pentangular *alveolæ*), into which the fl. or seeds are inserted being lacerato-toothed or shortly setiferous. Pappus of ripe fr. either *simple*—and then either soft (*pilose*) or stiff (*setose*) and either smooth or *rough* with minute denticulations of pubescence,—or feathery with long hairs (*plumose*); sometimes it is in 1–several rows, sometimes entirely wanting.

Distinguished from *Dipsaceæ* by the valvate æstivation of cor., coherent (syngenesious) anthers, erect exalbuminous ovule or seed wholly adherent to cal.-tube, and absence of a special involucel or outer cal. to the flts.

SUBORDER I. RADIIFLORÆ. (CORYMBIFERÆ Vaill., Juss. &c.)

(The Daisy, Groundsel, Everlastings, &c.)

Fl. *of disk* tubular mostly perfect and regular, *of margin* often imperfect (female or neuter) *mostly ligulate.* Style *not jointed or swollen upwards.*

Fl. either in small inconspicuous oblong or hemispherical DISCOIDAL i. e. rayless or inconspicuously rayed heads (*Erigeron, Eupatorium, Gnaphalon, Artemisia, Gnaphalium,* &c.), or conspicuously RAYED (*Daisy, Ox-eye Daisy, Sunflower, Dahlia, Marygold, Chrysanthemum,* &c.), with the ray mostly w. or y., rarely b. or purple. Herbs or shr., very rarely tr., often aromatic-bitter, never milky. L. and heads scarcely ever (exc. *Hoplophyllum, Iphiona*) prickly-spinose.

§ 1. *Anthers ecaudate or awnless at the base.*

A. Receptacle (with very few exceptions and no Madeiran) naked i. e. without chaffs or scales.

††Tribe I. *AGERATEÆ.*

Heads discoidal homogamous; fl. all perfect tubular regular. Branches of style elongate cylindric or subclavate obtuse *smooth upwards.* Ach. *angular.* Pappus *chaffy.*—Herbs mostly ann. rarely per. suffrutescent. L. opposite ovate toothed or crenate. Fl. w. or bluish without ray.

††1. AGERATUM. Heads many-fld. hemispherical; scales many in 2 or 3 rows subequal imbricate linear acuminate. Fl. 5-fid. Ach. 5-angular. Pappus of 5 or 10 free uncombined distinct chaffs produced into rough awns.—Fl. w., pale b. or lilac.

††Tribe II. *EUPATORIEÆ.*

Heads discoidal homogamous; fl. all perfect tubular regular. Branches of style elongate cylindric or semicylindric *pubescent upwards.* Ach. *cylindric ribbed.* Pappus *pilose.*—Fl. w. or purple without ray.

††2. EUPATORIUM. Heads many-fld. cylindric; scales rather few subequal imbricate. Fl. 5-fid, tube *funnel-shaped* or *gradually widening upwards from the base.* Branches of style cylindric obtuse, with 2 *distinct narrow* stigmatic marginal welts or borders below their middle. Recept. naked. Ach. obconic-oblong angular-ribbed. Pappus finely scabrous or pubescent *in a single row.*—Herbs or suffr. L. mostly opposite.

Tribe III. *ERIGERONTEÆ.*

Heads *heterogamous rarely homogamous*; fl. of disk (or rarely all the fl.) perfect tubular regular, of margin *ligulate or filiform* and *obliquely truncate.* Branches of style linear compressed, rounded and pubescent but simple at the tip. Ach. *compressed* rarely cylindric, *mostly without ribs.* *Pappus pilose.*—L. alternate. Fl. rayed or rayless.

†3. ERIGERON. Heads heterogamous many-fld. hemispherical; scales imbricate in several rows, *herbaceous.* Fl. of margin female in several rows, *all ligulate or with only the inner tubular-filiform*; of disk perfect or male only, all tubular 5-fid. Ach. linear-oblong *compressed ribless.* Pappus uniform pilose, rough or scabrous, in a single row. Recept. naked alveolate.—Mostly herbaceous. Fl. rayed (in Mad. sp. inconspicuously or minutely).

†4. CONYZA. Like *Erigeron* but fl. of margin not ligulate but *filiform truncate* or 2–3-toothed, of disk few perfect tubular 5-toothed, ach. linear attenuate at base, and recept. *fimbrilliferous.*—Herbaceous. Fl. wholly rayless.

5. GNAPHALON *. Heads heterogamous many-fld. *ovoidal or campanulate*; scales imbricate in many rows *scarious.* Fl. of margin female (fertile or barren) in several rows, *filiform*, of disk perfect tubular 5-toothed. Ach. *cylindric* rounded at top *ribless.* Pappus as in *Erigeron.* Recept. *naked flat.*—Small shr. with cottony-w. st. and l. Fl. *rayless.*

Tribe IV. *SENECIONEÆ.*

Heads heterogamous mostly radiate, rarely homogamous discoidal; fl. of margin mostly female and more or less conspicuously ligulate; of disk (or rarely all) perfect tubular regular. Branches of style (in perfect fl.) linear with a pencil or tuft of hairs below the truncate or produced conoidal tip. Ach. cylindric ribbed. *Pappus pilose.*—Fl. mostly radiant y.

6. SENECIO. Heads cylindric or campanulate; scales in a single row equal mostly linear combined or concrete and mostly calyculate with several short accessory scales at the base. Fl. of margin mostly female and ligulate; all sometimes perfect and tubular. Stigmas of perfect fl. semicylindric truncate hairy only at the tip. Ach. all with softly pilose pappus in several rows.—Fl. mostly conspicuously radiant, rarely rayless. Ray mostly y., sometimes purple, rarely w.

* Misspelled by Cassini and others *Phagnalon.*

††Tribe V. *COTULEÆ.*

Heads mostly discoidal heterogamous or rarely homogamous. Fl. of margin female (fertile or sterile) in one or several rows sometimes ligulate, of disk perfect, tube in all obcompressed or 2-winged often spurred lobed or auricled at the base; rarely all perfect. Branches of style bearded at the truncate or very rarely conoidal tip. Ach. obcompressed obovate 2-ribbed or marginate. Pappus 0.—Fl. rarely radiant.

††7. COTULA. Heads discoidal. Inv. imbricate hemispherical. Fl. of margin female (fertile or sterile) in a single row, of disk perfect; all tubular, tube obcompressed or 2-winged spurred at the base, limb 4-toothed or 4-crenate. Ach. marginate subdimorphous; of ray foliaceo-flattened stipitate, of disk narrower compressed sessile. Recept. flat naked.—Ann. branched herbs with inciso-toothed pinnatifid or pinnatipartite l. and branches produced into naked 1-fld. ped. Heads small y.

Tribe VI. *ARTEMISIEÆ.*

Heads discoidal homogamous or heterogamous with flts. of margin female, *of disk perfect; all tubular.* Branches of style linear with a pencil or tuft of hairs below the truncate or produced conoidal tip. Ach. cylindric or subcompressed ribbed or ribless. *Pappus* 0.—L. alternate pinnatisect. Fl. rayless.

8. ARTEMISIA. Heads either hemispherical, ovoidal or oblong; scales imbricate. Fl. of margin female, in a single row, not ligulate, 3-toothed; of disk perfect or barren tubular, the tube cylindric 5-toothed; or all sometimes perfect tubular. Ach. sessile obovate compressed, ribless, rounded at top; epigynous disk small narrower than the ach. without any crown. Recept. without chaffs, hairy (setose) or smooth.—Mostly greyish-w. or hoary strong-scented bitter-tasted herbs or shr. Fl. y. brown or purple rayless.

†Tribe VII. *HIPPIEÆ.*

Heads heterogamous monœcious, fl. of margin female, *of disk male; all tubular.* Style of female fl. *simple* or *shortly bifid,* of male *entire clavate.* Ach. *obcompressed* 2-ribbed or 2-winged. Pappus 0. Recept. naked.—Fl. rayless.

†9. SOLIVA. Heads globose many-fld.; scales 5–10 *in a single row.* Female fl. of margin numerous in many rows, without or with a very fine minute persistent filiform cor.; of disk few 3–6-toothed. Style of female fl. persistent

rigid scarcely bifid, of male simple broadly orbicular and truncate at the tip. Ach. tipped with the persistent style, winged or thickened at the 2 edges.—Small inconspicuous often prostrate herbs. Heads mostly sessile.

††Tribe VIII. *BELLIDEÆ.*

Heads heterogamous radiate; fl. of margin female *conspicuously ligulate, of disk perfect tubular regular.* Branches of style linear compressed not tufted below the tip. Ach. obcompressed *marginate not ribbed.* Pappus 0. Fl. radiant.

††10. BELLIS. Invol. hemispherical, scales in 2 rows, leafy, equal. Fl. of margin in a single row, of disk in many rows, 4–5-toothed. Ach. obovate. Recept. conical naked.—Herbs. L. simple chiefly radical. Fl. solitary on radical scape-like or axillary ped., disk y., ray w. or rose.

Tribe IX. *CHRYSANTHEMEÆ.*

Heads heterogamous radiate; fl. of margin female conspicuously ligulate; of disk perfect tubular regular. Branches of style (in perfect fl.) linear with a pencil or tuft of hairs below the truncate or produced conoidal tip. Recept. naked. Ach. often dimorphous cylindric *or triangular* ribbed. Pappus a membranous crown or 0.—Fl. radiant.

†11. PYRETHRUM. Inv. saucer-shaped cup-shaped or hemispherical, scales imbricate more or less scarious, the inner mostly obovate obtuse or spathulate. Fl. of ray fertile with a perfect forked exserted style, ligulate in a single row; of disk with the *tube obcompressedly winged,* 5-toothed. Ach. *of one sort, short uniform obconical or turbinate* truncate at top *ribbed all round* and *all with a narrow crown or border*; epigynous disk as broad as the ach. Pappus a membranous short crown. Recept. naked nearly flat or plano-convex.—Herb. per. or suffrutescent. L. of st. alternate. *Ray w.*—(In *Leucanthemum* Tourn., DC., all the ach. or at least those of the disk (*Phalacrodiscus* Less.) are crownless. *Matricaria* L. has the tube of the fl. simply cylindric, the ach. ribless at the back and the recept. in fr. conical).

††12. LEUCANTHEMUM. Like *Pyrethrum* but *all the ach.* or *those at least of the disk without crown or pappus.*

†13. MYCONIA. Like *Pyrethrum* but scales of inv. *subequal,* fl. of ray *sterile with the style abortive undivided not exserted,* and ach. *of 2 sorts*; of ray *barren or abortive slender cylindrically subtriquetrous neither winged nor ribbed*; of disk (fertile) *cylindric* equably 10-ribbed all round; *all in-*

curved smooth with a membranous *tubular dimidiate or auriculate crown or pappus sheathing the fl.-tube.*—Herb. ann. L. alternate. Fl. wholly y.

†14. CHRYSANTHEMUM. Like *Myconia,* but fl. of ray *fertile with a perfect forked style,* scales of inv. *unequal imbricate,* ach. of ray *fertile triquetrous with the* 2 *side angles only winged* and the back 3-ribbed, of disk turbinate-cylindric equably 10-ribbed all round; all simply truncate without any pappus, crown, or tooth.

†15. PINARDIA. Like *Chrysanthemum,* but ach. of ray triquetrous *with all the* 3 *angles especially the inner sharply winged and the sides obsoletely* 1–3-*ribbed,* of disk *compressed the inner angle only winged the back bluntly keeled and sides* 2–3-*ribbed; all reticulate-rugulose or granulate* and abruptly truncate with the wing or wings *ending in a laterally prominent or horizontal tooth or beak at the top* but without any crown or pappus.—Herb. ann. L. alternate scattered. Fl. pale straw or golden y.

16. ARGYRANTHEMUM. Like *Pinardia,* but ach. of ray *incurved or boat-shaped* much as in *Calendula,* and *all* (both of ray and disk) not truncate but *with a distinct dimidiate obliquely unilateral or intro-secund coriaceo-membranous* 3–4-*toothed crown or pappus. Recept. naked conical.—Shr.* altogether smooth, peculiar to the Mad. and Can. Islands. L. somewhat fleshy alternate *crowded towards the ends of the branches,* bipinnatisect. Scales of inv. broadly and conspicuously scarious. Fl. terminally corymbose: ray w. rarely rose, disk golden-y. rarely atropurpureous. Tube of fl. in Mad. sp. (*Stigmatotheca* Schultz in WB.) either altogether smooth or resinoso-punctate, in Can. sp. (*Argyranthemum* Schultz in WB.) mostly glandular-pubescent.—Easily distinguished at once from the 3 or 4 preceding genera by the shrubby habit, boat-shaped seeds and conical receptacle.

B. Recept. chaffy, wholly or partly.

Tribe X. *ANTHEMIDEÆ.*

(Like *Chrysanthemeæ* except the chaffy recept.) Heads mostly heterogamous; fl. of margin mostly ligulate female (sometimes neuter sterile) in a single row, rarely 0; of disk (or rarely all) perfect tubular regular. Branches of style in perfect fl. linear with a pencil or tuft of hairs below the truncate or produced conoidal tip. Recept. chaffy mostly conoidal. Ach. variously shaped mostly ribbed. Pappus mostly 0 or obsolete, rarely a short, complete or dimidiate or 5-toothed crown. Fl. mostly radiant. (In *Diotis* Desf. and sometimes in *Ormenus*

or *Marcelia* Cass. the heads are homogamous and discoidal or rayless with the fl. all perfect and tubular).

17. ORMENUS *. Inv. shallow concave or saucer-shaped imbricate. Fl. of margin female (sometimes neuter and sterile) ligulate in a single row, rarely wanting; of disk or rarely all perfect tubular equably 5-toothed, tube obcompressed winged or angular *saccate or produced at base over and embracing* (mostly with lobes spurs or auricles) *the top of the ach. or ov.* Ach. *clavate or cuneate rounded at top obcompressed 3-ribbed internally, back even or very finely striate*; epigynous disk *very small* more or less oblique. Crown or pappus 0. Recept. in fr. elongato-conic chaffy or scaly, the upper scales caducous.—Fl. rarely discoidal, mostly radiant, ray w. Herbs with a bitter aromatic scent and tonic properties. L. alternate finely compositisect. Chaffs of recept. sometimes embracing and inclosing the ach.

†18. ANTHEMIS. Inv. shallow concave or saucer-shaped imbricate. Fl. of margin female (sometimes neuter and sterile) ligulate in a single row; of disk perfect tubular equably 5-toothed, *tube obcompressed or winged but simple* (not spurred or saccate at the base). Ach. *obconic truncate at top ribbed all round*; epigynous disk *as broad as the ach.*, more or less distinctly marginate. Pappus 0 or very short and incomplete or rudimentary. Recept. *in fr. elongato-conic, chaffs mostly persistent.*—Herbs with alternate finely divided l. and w.-rayed fl.

††19. ACHILLEA. Inv. ovoid or hemispherical imbricate. Fl. of margin female ligulate in a single row; of disk perfect tubular 5-toothed, *tube compressed winged.* Ach. *oblong-obovate compressed* narrowly marginate *smooth and even*, epigynous disk without crown or pappus. Recept. *flat or convex* chaffy.—Bitter subaromatic perenn. herbs with terminal corymbose cymes of mostly w.-rayed fl. and finely divided alternate l.

†Tribe XI. *BIDENTEÆ.*

Heads heterogamous or homogamous; fl. of margin mostly ligulate and neuter; of disk and sometimes all perfect tubular regular. Anthers notched at the base, lobes acute. Branches of style in perfect fl. linear with a pencil or tuft of hairs below the truncate or produced conoidal tip. Ach. obcompressed or 4-sided *uniform. Pappus* 1 *or* 2–5 *awns.*

†20. KERNERIA. Inv. *campanulate*, scales in 2 rows, the outer herbaceous leafy *spreading or reflexed* mostly shorter

* Misspelled by Cassini and Gay *Ormenis.*

than the inner, the latter scarious erect. Fl. all perfect and tubular or a single row of the marginal neuter and ligulate. Ach. linear attenuated at each end quadrangular scarcely or not obcompressed strongly ribbed with a short oblique pale disk-like foot or podocarp at the base and 2 or 3 retrorsally spinulose awns at top. Recept. subconvex alveolate clothed with long chaffy scales.—Rank ann. scentless herbs or weeds. L. opposite. Fl. with or without ray; ray w.

††Tribe XII. *ECLIPTEÆ.*

Heads heterogamous; fl. of margin female ligulate, of disk perfect tubular regular. Anthers ecaudate notched at the base, lobes acute. Ach. obcompressed *dissimilar*, of margin triquetrous, of disk 4-angular; *pappus* 0 or obsolete.—Herbs with opposite l.

††21. ECLIPTA. Inv. hemispherical or saucer-shaped, scales few (10–12) in two rows all ovate acute leafy erect or adpressed imbricate. Fl. of margin in one row shortly and narrowly ligulate, of disk 4-toothed. Ach. of ray triquetrous smooth and even, of disk subquadrangular tuberculate or corrugate without pappus but obsoletely marginulate at top. Recept. subconvex with linear-filiform chaffs. —Tropical rough or strigose subaquatic herbs with opposite simple l., used for dying black. Fl. w. inconspicuously radiant. Heads solitary on 1–3 axillary ped.

§ 2. *Anthers caudate or awned at the base.*

A. Recept. scaly or chaffy all over.

Tribe XIII. *BUPHTHALMEÆ.*

Heads heterogamous radiate. Fl. of margin female ligulate, of disk perfect tubular regular. Anthers caudate. Branches of style linear compressed rounded and pubescent at top. Ach. dimorphous, the marginal triquetrous, the rest obconic with a ventral keel, *all crowned with a torn membranous pappus.*—Fl. radiant y. L. alternate simple. Herbs or shr.

22. ASTERISCUS. Inv. hemispherical umbilicate; scales imbricate in many rows, *the outer larger leafy spreading radiately*, inner coriaceous at least at base, adpressed. Fl. of margin numerous in 1–2 rows ligulate, their *tube triquetrous.* Anthers with *long* awns at their base. Ach. of ray larger triquetrous, of disk oblong-conic keeled in-

wards, crown or pappus a torn membranous rim or border. Scales of recept. keeled.

B. Recept. naked or scaly only at the margin.

Tribe XIV. *INULEÆ.*

Heads mostly heterogamous radiate. Fl. of margin female *ligulate*, of disk (and more rarely all) perfect tubular regular. Anthers with long awns at their base. Branches of style linear compressed, rounded obtuse and pubescent at the tip, not tufted. Ach. cylindric rarely 4-gonal, with or without ribs. Pappus *pilose* sometimes double. Rec. *wholly naked.*—Fl. *mostly* radiant.

23. INULA. Inv. campanulate or hemispherical, scales imbricate in several rows. Fl. of margin female in a single row, of disk perfect 5-toothed. Ach. cylindric-oblong mostly ribbed, very rarely ribless, scarcely contracted at top, not beaked. Pappus a single row of shortly ciliate caducous hairs with sometimes an outer membranous coronet of scales or crenulate cup or ring. Recept. small flat alveolate, the cells with a toothed membranous border. —Herbs, rarely suffrutescent, with alternate l. and radiant y. fl., glandular-viscous strong-scented.

Tribe XV. *GNAPHALIEÆ.*

Heads heterogamous rarely homogamous, discoidal very rarely radiate. Fl. either all perfect tubular 5-toothed or those of the margin female *filiform rarely ligulate.* Anthers with *long* awns at their base. Stigmas as in *Inuleæ.* Ach. cylindric or compressed *ribless.* Pappus pilose. Recept. naked or *chaffy only at the margin.*—Heads mostly small and discoidal. Fl. *rarely* radiant, w., purple, brown or y. Herbs or small shr. often hoary. L. alternate.

24. HELICHRYSUM. Inv. campanulate, scales scarious *coloured* imbricate in several rows *flat not radiant or radiant in fr. only.* Heads heterogamous; fl. all tubular, of margin female *few in number in only* 1–2 *rows*, always distinct from or not intermixed with the involucral scales, filiform 5-toothed; of disk perfect. Style bifid, stigmas scarcely thickened at tip. Ach. cylindric-oblong; hairs of pappus in a single row. Recept. flat naked.—Small shr. or herbs. Fl. without ray but with the scales of inv. sometimes radiant in fr.

25. GNAPHALIUM. Inv. *rounded not angular*; scales scarious imbricate in several rows *flat always stellately radiant in fr.* Heads heterogamous; fl. all tubular, of margin

female *in many rows not intermixed with the involucral scales*, filiform toothed; of disk perfect. Style bifid, stigmas obtuse. Ach. cylindric-oblong all free; hairs of pappus in a single row. Recept. flat naked.—Fl. rayless small and inconspicuous.

26. FILAGO. Inv. *conico-pyramidal* or ovoidal *5-angular*, scales *keeled or concave* imbricate in 3–5 rows, *the inner serving as chaffs of recept.* Heads heterogamous; fl. of margin female in several rows *from the axils of and mingled with the inner scales of the involucre*, filiform scarcely toothed; of disk perfect few tubular 4–5-toothed. Stigmas obtuse. Ach. *all free obovate compressed* pellucido-papillose. Pappus fragile caducous, in the outer fl. 0 or dissimilar. Recept. either elongated and subfiliform or short thickened and flattened at top, chaffy at the margin, naked in the centre.—Fl. rayless small.

27. XEROTIUM. Like *Filago*, but scales of inv. concave in 3 opposite rows; female fl. of margin in only 2 rows from the axils of the two inner rows of involucral scales; and outer row of ach. convolutely enwrapped or coated by the tubular-cymbiform middle row of involucral scales having their edges coherent or united downwards; the inner ach. naked free.

Tribe XVI. *CALENDULEÆ.*

Heads heterogamous radiate. Fl. of margin female ligulate, of disk *male* tubular. Anthers *shortly awned or caudate.* Stigmas short thick divaricate, convex and pubescent outwards. Ach. *dimorphous beaked* mostly *arcuate or boatshaped. Pappus* 0. Recept. naked.—Herbs sometimes suffrutescent, more or less glandulose or viscid, with alternate mostly simple undivided l. and radiant mostly or. or y. fl., disagreeably subaromatic.

28. CALENDULA. Inv. hemispherical, scales herbaceous distinct equal in two rows. Fl. of margin female ligulate fertile in 2–3 rows, of disk male or perfect with a simply capitate style. Ach. large dimorphous crescent- or boatshaped winged or simple and cylindric, incurved, rugose or muricate at the back. Recept. tuberculate.—Subviscid clammy subaromatic herbs, sometimes suffrutescent, with succulent light or full green foliage and simple undivided leaves. Fl. solitary terminal conspicuous or. or y.

Suborder II. CAPITIFLORÆ. (Cynarocephalæ Vaill., Juss. &c.)

(The Thistle, Artichoke, Burdock, &c.)

Fl. *all tubular*, of disk perfect regular, of margin like the central *or sterile and often enlarged.* Style of perfect fl. *jointed and swollen upwards below its branches.* Stigmas often combined or concrete. Fl. in mostly large conspicuous globose HEADS and mostly purple blue or w., rarely y.—Large coarse herbs, rarely shr. or milky in Mad. L. and heads mostly prickly-spinous. Coat or shell of ach. mostly hard testaceous. Recept. mostly chaffy-setaceous or fibrillose.

§ 1. *Anthers ecaudate or awnless at the base.*

Tribe XVII. *SILYBEÆ.*

Heads many-fld. separate (not aggregate on a common general recept. as in *Echinops* L.). Scales of inv. imbricate spinescent. Stam. *monadelphous, their filaments completely united.* Hilum basilary terminal. Pappus pilose or plumose united into a ring or short annular tube at the base, deciduous.

29. GALACTITES. Heads *heterogamous*; fl. *unequal, the marginal sterile larger and radiant*, the central perfect and fertile. *Stigmas concrete.* Scales of inv. *uniform* exappendiculate imbricate entire acuminato-spinescent. Ach. *narrow-oblong compressed or compressedly subcylindric* without ribs, very finely and obsoletely 10-*striolate or lineolate*; margin of epigynous disk entire. Pappus *plumose*, its hairs *in few rows long-feathered*, often slightly thickened upwards; *throat of ring or tube naked open.* Recept. densely hairy.

†30. SILYBUM. Heads *homogamous*; fl. all equal perfect fertile. *Stigmas distinct at the tips. Outer and middle scales of inv. expanded into a foliaceous spinous-toothed appendage narrowing into a long and strong spine*; the inner simple entire. Ach. *obovate-oblong* compressed without ribs or striæ; margin of epigynous disk entire. Pappus *pilose*; hairs *in many rows simply and very shortly or minutely denticulate or scabrous*, upper or inner edge of basal ring *with a crown of very fine smooth short connivent hairs closing the throat.* Recept. densely hairy.

Tribe XVIII. *CARDUINEÆ.*

Heads many-fld. separate. Scales of inv. imbricate mostly spinescent rarely appendiculate. *Fil. of stam. free.* Hilum

basilary terminal. Pappus pilose or plumose annular deciduous.

31. CYNARA. Heads *homogamous*; fl. all equal *perfect and fertile.* Scales of inv. imbricate entire, the outer *coriaceous* mostly exappendiculate and pungently spinoso-cuspidate or mucronate, the inner with a membranous or corneous feebly spinescent or unarmed apical appendage. Terminal appendage of anthers *very obtuse.* Stigmas distinct at the tip. Ach. "obovate 4-*angular* slightly compressed. Pappus plumose, hairs *in many rows.*" Recept. fleshy densely villous.—Fl. b.

†32. NOTOBASIS. Heads *heterogamous,* leafy-bracteate; fl. all equal, *the marginal sterile, the central perfect and fertile.* Scales of inv. imbricate coriaceous entire feebly spinoso-acuminate. Terminal appendage of anthers *acute.* Stigmas concrete. Ach. large *obliquely obovate gibbous much compressed subtetragonal each side with an obsolete keel or rib. Hilum suboblique; epigynous disk oblique immarginate.* Pappus plumose, hairs *in two rows.* Recept. densely villous. —Fl. purple.

33. CIRSIUM. Heads *homogamous*; fl. all equal perfect and fertile. Scales of inv. imbricate simple entire, *neither appendiculate nor scarious at the edges,* more or less spinescent. Terminal appendage of anthers *scarious linear-subulate.* Stigmas concrete. Ach. *oblong compressed* ribless; border of epigynous disk entire. Pappus *plumose,* hairs in many rows long-feathered except at the distinctly thickened tip. Recept. setaceo-chaffy.—Fl. purple or w.

34. CARDUUS. Like *Cirsium* but scales of inv. more or less *scarious* at the edges and pappus *simple pilose* finely toothed or pubescent *not plumose.* (*Carduus* and *Clavena* DC.).—Fl. purple or w.

Tribe XIX. *CENTAURIEÆ.*

Heads many-fld. *heterogamous.* Scales of inv. *uniform all imbricately adpressed* coriaceous with an apical scarious mostly ciliate or spinous rarely indistinct or obsolete appendage (abortive floral leaf or leafy bract). Marginal florets *mostly neuter sterile* often radiant. Fil. of stam. free. Ach. *compressed* rarely cylindric, *smooth and even,* rarely ribbed; the margin of epigynous disk *entire.* Hilum lateral. Pappus persistent rarely deciduous stiffly pilose or setose its hairs or bristles free to the base and often chaffy, rarely 0. Recept. chaffy-setaceous.—Fl. mostly purple, rarely b., w. or y.

35. CENTAUREA. Heads *heterogamous* rarely homogamous; fl. rarely all equal perfect and fertile, the marginal mostly larger sterile radiant. Scales of inv. imbricate *with a terminal scarious or corneous more or less armed and spinose or pectinately ciliate appendage.* Ach. oblong compressed ribless and even (except in *C. Massoniana*); border of epigynous disk entire (except in *C. Massoniana*). Pappus 0 or composed of stiff denticulate chaffy hairs or bristles in several rows, mostly persistent; the inner row formed of *shorter connivent hairs.* Recept. chaffy-setaceous.—Fl. mostly purple, rarely b., w. or y.

†36. MICROLONCHUS. Heads *heterogamous*; marginal fl. sterile more or less radiant, central perfect and fertile. Scales of inv. imbricate *coriaceous or corneous nerveless unarmed subexappendiculate and only sphacelate and often spinulosomucronulate at the tips.* Ach. oblong compressed *finely ribbed,* and *transversely wrinkled between the ribs*; border of epigynous disk entire. Pappus persistent *double,* outer of stiff chaffy hairs in many rows free to the base, *inner combined into a ring or crown produced on one side into a unilateral scale* as long as or a little shorter than the outer rows. Recept. chaffy-setaceous.—Fl. purple or w.

Tribe XX. *CARTHAMEÆ.*

Heads many-fld. *homogamous circinately leafy-bracteate.* Scales of inv. *heteromorphous,* the outer *foliaceous, or leafy-appendiculate spreading* mostly spinous, inner coriaceous imbricately adpressed mostly indistinctly scarioso-appendiculate and simply acuminato-cuspidate. Florets *all perfect fertile,* with a long slender tube. Fil. of stam. free. Ach. *tetragonal* smooth but *ribbed or rugose upwards* with the margin of the epig. disk *toothed or crenate.* Hilum lateral. Pappus persistent free to the base chaffy or chaffy-setose rarely 0. Recept. chaffy-setaceous.—Fl. y. or. or b.

†37. KENTROPHYLLUM. Heads *homogamous,* fl. all equal perfect fertile. Outer scales of inv. leafy or leafy-appendiculate strongly many-nerved pectinately ciliato-spinous cuspidate, inner coriaceous or corneous *nerveless* oblongo- or ligulato-lanceolate entire subexappendiculate but with discoloured serrulate or entire cuspidately spinous tips. Fil. free with a collar or tuft of hairs towards their top. Ach. thick obovate, irregularly but acutely *tetragonal gibbous submuricately ribbed or rugose upwards*; border of epigynous disk *irregularly* (principally 4-) *toothed.* Pappus *in the marginal ach.* 0, *in the rest* consisting of numerous finely serrulate very unequal *erecto-patent ligulate or linear chaffs*

imbricate in many rows, the inner row extremely short erecto-connivent forming a distinct short central umbilical tuft or coronet. Recept. chaffy-setaceous conical.—Fl. y.

†38. CARDUNCELLUS. Like *Kentrophyllum*, but inner scales of inv. *parallelly many-nerved* and *distinctly appendiculate* with a dilated spathulate discoloured pectinately ciliate or lacerato-fimbriate tip. Ach. as in *Kentr.*, but pappus in *all (marginal and central)* chaffy-*setaceous* finely *ciliato*-serrulate, the hairs or setæ numerous unequal but *not imbricate*, the inner row erecto-connivent, not *short* (all free to the base and persistent in the only Mad. sp., in others said to be annularly connate at the base and deciduous). Recept. chaffy-setaceous "flat."—Fl. b.

†††39. CARTHAMUS. Like *Kentrophyllum* or *Carduncellus*, but inner scales of inv. parallelly many-nerved *wholly exappendiculate* and simply acuminato-cuspidate, fil. of stam. nearly smooth *without any distinct collar or tuft of hairs at top*; and ach. *all without pappus* subobtusely tetragonal quite smooth and even or only slightly and obsoletely rugulose or wrinkled at top, with the border of the epigynous disk obtusely 4-toothed and subcrenulate. Recept. chaffy-setaceous plano-convex or depresso-conoidal.—Fl. or. or y.

§ 2. *Anthers caudate or awned at the base.*

Tribe XXI. *CARLINEÆ.*

Heads many-fld. homogamous. Scales of inv. appendiculate or simple, spinous or unarmed. Fil. of stam. free upwards, *adnate downwards to cor.*; awns of anthers often ciliato-plumose. *Hilum basilary.* Pappus pilose or plumose. Recept. chaffy-setaceous.

A. Outer scales of inv. foliaceo-appendiculate spinous. (Gen. *Carlina*, *Atractylis.*)

40. CARLINA. Heads hemispherical leafy-bracteate, fl. all equal perfect fertile. Outer scales of inv. leafy or leafy-appendiculate spinous-toothed or ciliate, the inner simple unarmed entire scarious coloured mostly radiant. Basal awns of anthers plumose. Ach. cylindric-oblong subangular adpressedly hairy or silky-pubescent with short forked hairs forming an erect fringe or crown at top round the immarginate epigynous disk. Pappus a single row of plumose setaceous hairs combined or concrete at the base by threes or fours in sets or fascicles and all deciduous in a ring together. Recept. flat chaffy, chaffs setoso-lacerate tubular at base.—Mostly herbaceous; but the only

Mad. sp. is a low straggling shr. with finely spinulosociliate l. and large leafy heads of dull w. or pale straw-col. fl.

B. Scales of inv. all exappendiculate simple unarmed. (Gen. *Jurinea, Stæhelina, Lappa.*)

41. LAPPA. Heads globose homogamous : fl. all equal perfect fertile. Scales of inv. squarrosely imbricate linear-lanceolate produced into a long point hooked at the tip. Awns at base of anthers simple smooth (not bifid, lacerate, ciliate, or plumose). Stigmas concrete halfway up. Ach. oblong compressed ribbed; border of epigynous disk entire. Pappus setose short deciduous, bristles in many rows denticulate free to the base. Recept. chaffy-setaceous.—Unarmed coarse large-leaved herbs with erect branched st., broad ample foliage and clustered inconspicuous bur-like heads prehensile in fr. Fl. purple.

SUBORDER III. LIGULIFLORÆ DC. (CICHORACEÆ Vaill., Juss. &c.)

(The Dandelion, Lettuce, Sowthistle &c.)

Fl. *all ligulate* perfect. Style *not* jointed or swollen upwards. Stigmas always more or less distinct.

Milky bitter-tasted herbs (rarely suffr.) with conspicuous mostly radiato-ligulate (very rarely capitifloral or cynarocephalous) y. rarely b. p. or purple, very rarely w. fl.; the outer flts. mostly radiant. L. alternate and like the heads very rarely prickly-spinous. Properties tonic or narcotic.

†Tribe XXII. *SCOLYMEÆ.*

Heads capitifloral armed involucrate with spinous leafy br. Scales of inv. imbricate spinescent. Ach. not beaked obcompressed closely coated winged and crowned with the conduplicate adherent pericarp-like chaffs of the recept.—Erect spinous thistle-like herbs. Fl. y. or or. Tube of florets woolly upwards.

†42. SCOLYMUS. Heads ovate. Scales of inv. adpressed coriaceous cuspidate with narrow membranous edges. Ach. obcompressed obcuneate enveloped entirely except the apex or epigynous disk in the winged adherent pseudopericarp. Pappus 0 or obsoletely chaffy-coroniform, with or without 2–4 inner deciduous setules. Recept. conical or hemispherical chaffy.

Tribe XXIII. *HYOSERIDEÆ.*

Heads radiato-ligulate unarmed. Inv. double or single and bracteolate, the scales and br. herbaceous. Ach. truncate not beaked. Pappus *coroniform and chaffy*, or *simply setose* and in either case *sessile*, mostly dimorphous, sometimes double. Recept. naked *without chaffs.*

†43. CICHORIUM. Inv. double; outer of 5 short scales, inner of 8 much longer, scales in a single row herbaceous hardened and combined at the base in fr. Ach. persistent angular compressed subclavate, broad and truncate at top, crowned with 1–2 rows of numerous short obtuse chaffs. —Fl. b. rarely w. or p.

44. TOLPIS. Inv. single of numerous close linear scales in 2 or more rows squarrosely or loosely calyculate or fringed at the base with linear subsetaceous bracts passing down the ped. Ach. small subtetragonal. Pappus a single row of mostly few simple unequal pale coloured stiffish hairs or bristles intermixed with excessively minute short setules and reduced sometimes altogether in the marginal ach. to a very short or narrow fimbriated crown of the latter.—Herbs or suffr. Fl. y.

45. HEDYPNOIS. Inv. single, scales *in a single row* or with only a few adpressed shorter scales or bractlets at their base, thick or fleshy at the back, subcylindrically conduplicate or semitubular and inclosing the outer ach. in fr. Ach. subcylindric incurved longitudinally striolate and elegantly squammulose; pappus of the outer ach. a short membranous toothed cup or crown, of the inner double, the outer row cup-shaped or of a few short chaffs, the inner of about 5 chaffy-setose acuminato-lanceolate scales produced into scabrous awns or bristles.—Low weedy herbs with bright gr. foliage and y. fl.

†Tribe XXIV. *LAMPSANEÆ.*

Like *Hyoserideæ*, but ach. naked without crown or pappus.

†46. LAMPSANA. Inv. cylindrico-campanulate calyculate with very short adpressed scales at the base, the inner scales 8–10 linear equal in a single row, all persistently erect in fr. Ach. deciduous clavato-fusiform straight or incurved.—Erect branched weedy herbs with small y. fl. of few flts.

Tribe XXV. *LEONTODONTEÆ.*

Like *Hyoserideæ*, but ach. mostly beaked and pappus plu-

mose at least in the inner ach., the hairs free not interlacing.—Scapigerous rarely caulescent mostly hispid herbs. Fl. y.

47. THRINCIA. Inv. oblong single, scales in a single row erect equal conduplicate in fr., imbricately subcalyculate with shorter close-pressed scales at the base. Ach. finely muricately ribbed or striate longitudinally, all or at least the inner more or less attenuately beaked, the outer sometimes beakless enclosed in the inner scales of the inv. Pappus dimorphous; of outer ach. sessile chaffy short lacerato-coroniform, of inner stipitate plumose.—Hispid stemless herbs with only radical l. and 1-fld. scapes or ped. Fl. y.

†48. HELMINTHIA. Inv. double, outer of 3–5 loose leaf-like scales or br., inner urceolate of 8–10 erect narrower scales in a single row. Ach. transversely rugose subabruptly beaked, beak slender filiform. Pappus uniform plumose.—Erect branched herbs with harsh stiff strigose prickly-hispid heads and foliage. Fl. y. subcymose.

†49. UROSPERMUM. Inv. single urceolate or campanulate of 8 scales in a single row, concrete at the base. Ach. strongly muricate beaked, beak long tubular dilated or inflated at the base and separated by a diaphragm from the ovule. Pappus plumose deciduous.—Erect sparingly branched few-fld. herbs with rather large pale y. solitary fl. L. mostly radical hispid or puberulous.

Tribe XXVI. *SCORZONEREÆ.*

Like *Leontodonteæ*, but lateral hairs of plumose pappus interlacing horizontally or cancellate. — Sparingly branched mostly smooth herbs with ascending few-fld. st. and mostly entire grass-like l. Fl. solitary rather large y., sometimes purple.

†50. GEROPOGON. Inv. simple, scales 8 in a single row equal not reflexed in fr. Ach. fusiform striate attenuately beaked, the marginal persistent with the pappus simple setiform awn-like 3–5-rayed, the inner deciduous with the many-rayed pappus cancellato-plumose.—Smooth with linear simple entire grass-like l. and lilac-rose or purple fl.

Tribe XXVII. *HYPOCHŒRIDEÆ.*

Like *Leontodonteæ*, but recept. chaffy, the chaffs deciduous. —Herbs with mostly radical l. in a rose or tuft and erect scape-like sparingly branched leafless fl.-st. Fl. y.

51. HYPOCHŒRIS. Inv. cylindric, scales regularly imbricate

in many rows. Ach. fusiform striate submuricate upwards, the inner or all attenuately beaked, the outer and sometimes inner erostrate. Pappus persistent either in 2 rows, the outer short setiform denticulate, inner longer plumose —or in a single row plumose. Chaffs of recept. linear-acuminate.—L. chiefly radical. St. scape-like numerous ascending sparingly branched few-fld. naked. Fl. terminal long-stalked sometimes solitary.

Tribe XXVIII. *CHONDRILLEÆ.*

Inv. oblong or campanulate-oblong double or calyculate, scales in 2 or many rows, the outer one or more short forming a distinct fringe or calycle at the base of the long erect single inner row. Ach. ribbed beaked scaly-muricate or coronulate upwards or at base of the slender filiform beak or pappus-stalk. Pappus pilose capillary soft and w. Recept. naked.—Herbs with or without st. L. mostly radical. Fl. y. cymose or solitary on scape-like ped. Flts. few or many.

†52. TARAXACUM. Inv. campanulate-oblong many-fld., outer shorter scales in many rows mostly lax or spreading. Florets numerous in many rows. Ach. linear-oblong subcompressed ribbed or striate imbricato-muriculate or muricato-turriculate upwards. Recept. convex.—Stemless herbs, l. all radical with a thick fleshy midrib. Ped. 1-fld. scape-like radical tubular. Fl. y.

Tribe XXIX. *LACTUCEÆ.*

Inv. narrow-oblong or urceolate sometimes calyculate, mostly regularly imbricate with scales in many rows. Ach. *obcompressed flattened* with or without beak simple at top (not coronulate or muricate). Pappus stalked or sessile pilose very soft and w. linear-capillary caducous. Recept. naked.—Branched erect very milky herbs. Fl. mostly small cymose, y., or., b. or purple.

53. LACTUCA. Inv. narrowly *cylindric*, in fr. a little thickened at the base, calyculate or regularly imbricate, mostly few-fld. Ach. oblong or lanceolate *beaked*; beak or pappus-stalk slender filiform.—Smooth mostly virgate-stemmed herbs with terminal oblong panicles of numerous small y., lilac or b. fl.

54. SONCHUS. Inv. *urceolate* prominently swollen at the base many-fld., scales regularly imbricate. Ach. elliptic-oblong truncate at top *not beaked*. Pappus *sessile* silvery-w.—Herbs or shr. mostly smooth often glaucous. Fl. y. moderately large.

Tribe XXX. *CREPIDEÆ.*

Like *Lactuceæ*, but inv. always broadly oblong, ach. rounded fusiform or subcylindric sometimes subangular or subcompressed (not flattened) mostly without beak, and pappus mostly sessile stiffish dirty w.—Fl. mostly rather large and y. very rarely pink or purple.

55. CREPIS. Inv. mostly double or distinctly calyculate or bracteolate at the base, the outer scales short lax, inner close erect equal in one row; all sometimes regularly imbricate. Ach. rounded subcompressed subangular fusiform more or less beaked or beakless, variously ribbed or striate. Pappus stalked or sessile capillary w.—Herbs of various habit, mostly smooth or succulent. Fl. mostly corymbose and y., very rarely pink or purple.

56. ANDRYALA. Inv. indistinctly double, the few short outer scales or bractlets often deciduous or abortive, inner of 1 row, many-fld. Ach. *very small* cylindric 10-ribbed truncate and 10-toothed at top. Pappus *sessile* very deciduous dull w. capillary stiff denticulato-scabrous almost plumose at the base. Recept. sometimes subsetose.—Erect branched greyish stellately woolly or tomentose herbs or suffr. Heads cymoso-paniculate. Fl. moderately large y.

Table of Genera.

I. RADIIFLORÆ. (CORYMBIFERÆ Vaill., Juss. &c.)

§ 1. Anthers ecaudate or awnless at the base.

A. Receptacle naked.

Tribe I. AGERATEÆ.

1. *Ageratum.*

Tribe II. EUPATORIEÆ.

2. *Eupatorium.*

Tribe III. ERIGERONTEÆ.

3. *Erigeron.*
4. *Conyza.*
5. *Gnaphalon.*

Tribe IV. SENECIONEÆ.

6. *Senecio.*

Tribe V. COTULEÆ.

7. *Cotula.*

Tribe VI. ARTEMISIEÆ.

8. *Artemisia.*

Tribe VII. HIPPIEÆ.

9. *Soliva.*

Tribe VIII. BELLIDEÆ.

10. *Bellis.*

Tribe IX. CHRYSANTHEMEÆ.

11. *Pyrethrum.*
12. *Leucanthemum.*
13. *Myconia.*
14. *Chrysanthemum.*
15. *Pinardia.*
16. *Argyranthemum.*

B. Receptacle chaffy.

Tribe X. ANTHEMIDEÆ.

(Like CHRYSANTHEMEÆ except the chaffy receptacle.)

17. *Ormenus.*
18. *Anthemis.*
19. *Achillea.*

Tribe XI. BIDENTEÆ.

20. *Kerneria.*

Tribe XII. ECLIPTEÆ.

21. *Eclipta.*

§ 2. Anthers caudate or awned at the base.

A. Receptacle scaly or chaffy all over.

Tribe XIII. BUPHTHALMEÆ.

22. *Asteriscus.*

B. Receptacle naked or scaly only at the margin.

Tribe XIV. INULEÆ.

23. *Inula.*

Tribe XV. GNAPHALIEÆ.

24. *Helichrysum.*
25. *Gnaphalium.*
26. *Filago.*
27. *Xerotium.*

Tribe XVI. CALENDULEÆ.

28. *Calendula.*

Suborder I. RADIIFLORÆ. (Corymbiferæ Vaill., Juss. &c.)

§ 1. *Anthers ecaudate or awnless at the base.*

A. Receptacle naked.

††Tribe I. *Ageratecæ* Less.

††1. Ageratum L.

Sect. *Euageratum* DC. Chaffs of pappus 5 serrate acuminato-aristate.

††1. A. conyzoides L.

Ann. herb. more or less furry-pubescent; st. and branches square or ribbed and angular, rounded in age only; l. hispidulous subglabrescent broadly ovate obtuse or subobtuse bluntly crenate scarcely half as long again as broad; scales of inv. smooth or glabrescent serrulate or ciliato-scabrous upwards; flts. smooth, styles moderate in length; pappus erecto-patent divergently or radiately spreading, distinct at base; ach. black finely reticulato-striate, the angles erectly serrulato-ciliate.—Linn. Sp. 1175; Pers. Syn. 402; DC. v. 108 (excl. var.).

Var. *albiflora*; heads larger, fl. w.—*A. album* Willd. ex Steud.—Herb. ann. Mad. reg. 1, c. By watercourses and in moist places by roadsides or in vineyards about Funchal here and there at most seasons but chiefly Spr. or Aut.—A somewhat robust coarse-leaved rather dull gr. erect branched leafy singly-growing pl. 1–2 ft. high. St. and branches stout not woody mostly dark dull red or purple, more or less furry with short crisped subglandular hairs. L. opposite broadly subrhomboidal-ovate, cuneate or truncate rather than cordate at the base more or less obtuse crenate subrugose glabrescent or sparingly adpressedly hispid, 1½–2½ in. long, 1–1¾ broad, on slender furry or hirsute petioles about half their own length. Fl. always in Mad. somewhat dull dirty w., never at all blue or lilac as in the less robust fewer and smaller-headed universal Cape-Verde-Island var. (*Ag. cæruleum* Desf. Cat. Hort. Par. = *A. conyzoides* * *cæruleum* Pers. l. c. = *A. obtusifolium* Lam. = *A. conyzoides* α DC. l. c. = *A. conyzoides* Hook. Ex. Fl. t. 15; Schm. Fl. Cap. Verd. 184 excl. syn. var. *Mexicanum* DC. and *A. Mexicanum* BM. t. 2524),—in dense terminal not large or conspicuous cymes. Heads small 2 lines in diam.; scales about 15 (12–20) glabrescent light gr. their tips pink or purple, 2-ribbed flat linear-lanceolate aristato-acuminate, the edges w. membranous subserrulate or serrulato-ciliolate upwards. Flts. very small w. slender smooth, the pale gr. tube only minutely

glandular or resinoso-punctate. Branches of style w. moderately long but much shorter and less conspicuous than in *A. mexicanum* Sims and scarcely clavate. Recept. naked conico-pulvinate or mamillate. Pappus of 5 radiating lanceolate pale straw-coloured (not w.) stiff chaffy-setaceous very rough awns membranously dilated and strongly serrulate irregularly downwards, about one line long. Ach. small 1 line long black shining strongly or sharply 5-angular narrow-oblong truncate at top scarcely attenuated downwards smooth except a few remote short glittering points or erect setules with which the 5 angles are serrulate or ciliate; *basal areola* or scar oblique tumid yellowish or brownish ivory-w.

In withering or drying the fl. give out the scent of new-mown hay or Woodruff (*Asperula odorata* L.), mixed however with a strong unpleasant odour. Otherwise the pl. is wholly scentless.

The chaffs or awns of the pappus are more gradually dilated downwards and roughly or coarsely serrulate than in *A. mexicanum*; they are also distinct, not imbricated laterally, quite down to the base; the ach. are uniformly black shining and very finely and minutely but distinctly striolate both longitudinally and transversely, with the oblique callous w. ring or scar at the base larger and more tumid.

The common Cape Verde pale-b.- or lilac-fld. var. of this pl. is said by Schmidt (Fl. Cap. Verd. 184) to be the same as he had observed in Mad., which is quite at variance with my experience. Nor on the other hand did I ever meet with *A. conyzoides* var. *Mexicanum* DC.=*A. Mexicanum* BM. t. 2524 which he includes in his syn., in any of the Cape Verde islands.

††2. A. MEXICANUM Sims.

Perennial herbaceo-suffrutescent thickly furry-pubescent; st. and branches altogether round and even throughout, shrubby and smooth downwards; l. hispid-pubescent rhomboidally or triangularly oblong-ovate acute sharply serrate often twice as long as broad; scales of inv. hirto-pubescent entire; flts. glandular-pubescent; styles very long; pappus erect close and laterally imbricate at base; ach. quite smooth and even, sprinkled or ciliate up the angles with short erect setules.—BM. t. 2524. *A. conyzoides* γ *Mexicanum* DC. v. 108.—Herb.-suffr. per. Mad. reg. 2, r. About cottages in fences and on banks by roadsides &c., quite naturalized locally here and there; Pco da Cruz 500–1000 ft.; Rib. de Machico at the head of the Machico Valley;

Serra d'Agoa, &c. Jan.–May, but at almost all seasons.—Pl. gregarious forming large beds or patches, wholly pubescent. Roots per. creeping. St. numerous erect or ascending branched bushy leafy, suffrutescent woody and brittle downwards, round from the first throughout and only a little compressed at the joints or nodes. Foliage of a somewhat dull not hoary gr. L. opposite stalked on shortish furry petioles $\frac{1}{4}$–$\frac{1}{2}$ their length oblong-ovate acute sharply and evenly serrate, entire and subcuneate or truncate at the base, $1\frac{1}{4}$–2 in. long $\frac{1}{2}$–$1\frac{1}{2}$ broad. Cymes numerous terminal dense many-fld. handsome from the fine lavender or lilac-blue of the long exserted styles. Heads moderately large 3–4 lines long and broad hemispherically or broadly and shortly campanulate; inv. half the length of flts.; scales 15–25 subvilloso-pubescent subequal and scarcely imbricate strongly 2-ribbed or nerved linear aristato-acuminate entire herbaceous, gr. below, dark reddish or purplish upwards. Flts. glandular-pubescent, tube w., teeth fine lilac-blue like the smooth upper halves or more of the very long cylindric or slightly clavate erecto-radiant, presently flaccidly deflexed, in drying tortuose, styles.—Ach. smooth or sprinkled up the angles and upwards between them with a few minute shining erect points or setules; in all my Mad. and in English garden spec. abortive and hence probably shining pale brown or light fawn-colour instead of black as described in BM. l. c., the 5 sharp ribs or angles darker, the interspaces plano-concave quite smooth and even (not striolate) narrowly oblong-pentagonal truncate at top, attenuated downwards with an oblique callous shining w. scar at the base. Pappus of 5 erect parallel lanceolate finely serrulate chaffs, all or sometimes only 2–4 produced into finely rough stiff setaceous awns $\frac{3}{4}$–1 line long i. e. about as long as or a little longer than the ach., approximate and laterally overlapping downwards. Recept. wholly naked small pulvinato-conical or mamillate coarsely foveolate.

This is the pl. so commonly cultivated in garden-beds in England under the name of Blue Ageratum.

No two pl. in any genus can be more constantly distinct as sp. than the present and its immediate precursor. Except in the points included in the generic character, they differ strikingly in almost every particular.

††Tribe II. *Eupatorieæ* Less. (*Adenostyleæ* DC.)

††2. Eupatorium L.

††1. E. adenophorum Spr. *Inça muito* or *Abundancia.*

St. subangular erect herbaceo-suffrutescent, branches and petioles glanduloso-pubescent, l. opposite stalked triangular or rhomboidal acute wedgeshaped at base, 3-nerved, coarsely serrate, nearly smooth above, subpuberulous beneath; cymes terminal trichotomous, heads pedicellate 35–40-fld., inv. campanulate, its scales in 1-2 rows equal glandular-pubescent subciliate; ach. 4-angular smooth.—Spr. Syst. iii. 420; DC. v. 164. *E. glandulosum* Humb. et Kth. Nov. Gen. Am. iv. 122, t. 346; Lindl. Bot. Reg. xx. (or vii. New Ser.) t. 1723 (non Michx.).—Herb. suffr. per. Mad. reg. 1, 2, 3, ccc. By watercourses and on wet rocks and banks chiefly, but also often in dry places, everywhere about Funchal, and running far up the ravines there and in most parts of the island. March–Nov.—A tall erect branched leafy large strong-growing pl. 2–5 ft. high with somewhat shining dark-gr. rather handsome foliage and copious branched panicled cymes of rather dull w. fl. St. and branches stout stiff rounded striate dark reddish or purple, clothed like the petioles with short close-set crisped gland-tipped subviscid hairs. Petioles slender about ½ length of l.; the latter 2–3 or 4 in. long, 1¾–2½ broad, shining and smooth above except the nerves, powdery-puberulous all over beneath, becoming ultimately nearly or quite smooth on both sides; the 2 side margins coarsely toothed, the 3rd or basal below the 2 side angles entire and more or less cuneate rendering the normally triangular l. more or less rhomboidal. Fl. numerous w. with the eye or centre in bud purple, slightly fragrant like Hawthorn, in large trichotomously branched leafy paniculate cymes. Heads or calathids 3 lines long and broad on slender densely glandular-pubescent viscid ped. 3 or 4 lines long which are mostly furnished also with several fine extremely narrow-linear almost capillary gr. bracts. Scales gr. 2–3 or 4-ribbed membranous at the edges and often subserrulate upwards, all ciliate and clothed all over with purple-headed glands, acute or acuminate but not aristate. Pappus in a single row of few (5–10) soft pure w. hairs scarcely longer than the flts. or about twice the length of ach. erectly pubescent equally all the way up i. e. thickly clothed with short upright hairs, deciduous. Ach. very small and slender 1 line long black shining entire naked very finely and minutely reticulato-granulate fusiform or oblanceolato-oblong i. e. more attenuate at base than at top, strongly 4-angular, interspaces of angles or ribs concave plain (not striate). Recept. convex pustulate naked.

Introduced into Mad. scarcely before 1840, and first noticed on the walls of the Rib. de S^ta^ Luzia in Funchal below the house of a former British Consul, Mr. Veitch, from whose garden, supplied with pl. and seeds occasionally by the Horticultural Society of London, it was probably thus at first a straggler; this pl. had even in 1855 already spread in vast profusion over all the neighbourhood of Funchal and elsewhere, even in the N. of the island, up to an elevation of 2000 or 3000 ft. or more; forming, in some places, hedges about cottage gardens, and in ravines (as up the Rib. de S^ta^ Luzia almost to the foot of the great waterfall) thickly clothing the wet dripping perpendicular cliffs in many places as if perfectly indigenous. Unfortunately it seems inpplicable to any use but litter, and is entirely unfit for fodder. The Portuguese have given it a very apposite name, "*Inça muito*,"—equivalent to Spread-much, or literally (as applied to insects) Swarm-much. It is originally from Mexico and was first brought to England in or about 1830.

Tribe III. *Erigeronteæ*. (*Erigerineæ* Gr. and Godr.)

†3. ERIGERON L.

†1. E. CANADENSIS L. *Avoadeira.*

St. more or less hirtose or hirsute erect straight stiff virgate either simple or with similar erect virgate shorter side branches, each, like the taller main st. terminating in an elongate-oblong pyramidal compound many-fld. leafy thyrse of small lateral cymes; l. linear-lanceolate attenuated at both ends, ciliato-hirtose, the lower here and there remotely toothed; heads very small and numerous subcylindric, scales lax glabrescent, female fl. ligulate, ligules or rays erect short inconspicuous scarcely overtopping the scales; pappus pale straw or yellowish; ach. pubescent.—Sm. E. Fl. iii. 421, Spr. iii. 517; Koch 388; Bab. 171; Gren. et Godr. ii. 96; Willk. et Lange Fl. Hisp. ii. 34. *E. canadense* L. Sp. 1210; Fl. Dan. t. 1274; E. B. t. 2019; DC. v. 289; RFG. xvi. t. 26. f. 1. *E. canariense* (sic! misprint for *canadense*) Buch 194. no. 260. *Conyza canadensis* Bocc. Ic. 85. t. 46. *Virga aurea Virginiana* Barrel. Ic. p. 96, v. *Conyza minor unicaulis* &c. t. 1164.—Herb. ann. Mad. reg. 1, 2, 3, cc. A universal weed in gardens, vineyards and cult. ground chiefly below 3000 ft. June–Dec.—Not found in PS. or the Desertas.—Root small pale tapering. Whole pl. dull or dark somewhat hoary-gr. St. 1½–4 or 5 ft. high, virgate slender but stiff and hard

very straight and upright, erectly branched mostly above the middle, somewhat copiously leafy throughout. L. 1–3 in. long, 1–3 or 4 lines broad, the upper gradually narrower, the lower and root-l. (the latter forming a rose-like tuft at first) dying off as the pl. comes into fl.; all more or less hirtose and ciliate at the edges at least downwards, but sometimes nearly smooth. Thyrse 6–9 in. long, 3–4 broad, leafy many-fld. Fl. pale ochre straw-colour or dirty-w., 1–2 lines long, 1–1½ broad. Scales linear-lanceolate with membranous edges nearly smooth. Flts. minute, of disk y. perfect 5-cleft tubular, of ray pale dirty-w. female minutely ligulate. Ach. truncate at top pale brown or straw-colour; pappus sessile pale yellowish w. or straw-colour stiff fragile and minutely rough or scabrous.—Varies much in hairiness, being sometimes nearly smooth. An altogether useless but not troublesome weed.

†4. Conyza L.

†1. C. ambigua DC.

Greyish hirtose or hirsute erect stiffly branched subproliferously, each branch terminating in a narrow scarcely compound leafy not many-fld. racemiform cyme rising above that of the main st. or primary main branches; l. linear lanceolate attenuated at both ends, thickly hirsuto-pubescent on both sides and subciliato-hirtose, the lower remotely and irregularly deeply inciso-toothed; heads moderately large shortly and broadly cylindric not numerous, crowded and simply racemose upwards, scales closely erect hirsuto-pubescent linear-acuminate not overtopping the disk; pappus dull w. or rufescent; ach. pubescent.—DC. v. 381; Seub. Fl. Az. 32; Gr. et Godr. ii. 96; Willk. et Lange Fl. Hisp. ii. 34. *Erigeron linifolium* Willd. ex DC. *E. linifolius* RFG. xvi. t. 22. f. ii. *E. contortum* "Desf.," Pers. ii. 432. no. 40. *E. canadense* Ten. Prodr. ex DC.; Brot. i. 359 (not Linn.). *E. ambiguus* Schultz Bip. in WB. ii. 208. —Herb. ann. Mad. reg. 1, 2, c. In gardens, vineyards and by roadsides occasionally everywhere below 2000 ft. at most seasons. Not seen in PS. or the Desertas.—In foliage and fl. much like the last, but wholly different in its low subproliferous habit or inflorescence and much larger calathids. Root rather strong and woody. Whole pl. somewhat hoary-gr., hirtosely or hirsutely pubescent, 9–18 in. high. From below the main terminal raceme-like cyme spring 2 or more branches, each ending in a cyme considerably overtopping the 1st, and so on once or twice in succession; the whole of the side cymes ultimately rising nearly to a level in a corymbose manner. Cyme with short few-fld. side branches below, crowded and racemose or simple upwards, the heads 2½–3 lines long, 2–2½ broad, on slender hirtoso-pubescent pedicels. Scales hairy-pubescent mostly deep

bright purple or crimson upwards or at the tip, giving the heads a gayer appearance than in *E. canadensis*, gr. below. Flts. very small and slender filiform, female of margin mostly irregularly 2–3-toothed not "lingulate or 5-toothed" (as described in WB. l. c. 209) very numerous in a broad w. outer ring of many rows; perfect of disk few sulphur-y. Pappus sessile dull w. sometimes pale brown or fawn-colour with a warm purplish tint. Ach. pale brown or straw-colour truncate at top. Recept. strongly alveolate, the angles of the cells raised toothed or shortly setiform.

5. GNAPHALON i. e. PHAGNALON Cass.

1. G. SAXATILE (L.). *Isca* in P^to^ S^to^.

Suffr. many-branched from the base, branches lax diffuse or ascending closely and adpressedly snowy-tomentose dividing at top subproliferously into several short branchlets each ending in one or sometimes two slender naked 1-fld. ped.; l. sessile all squarrose loosely spreading or recurved narrow linear-lanceolate or linear acute naked glabrescent or thinly webbed above, densely snowy-tomentose beneath, the margins revolute and in the lower l. irregularly and remotely repand-toothed or waved; ped. solitary scattered or dispersed and axillary towards the ends of the branches rarely truly terminal or geminate, 1-fld. slender elongate; heads in bud ovate, in fl. and fr. *oblongo-campanulate or cylindric* $\frac{1}{3}$–$\frac{1}{4}$th longer than broad; scales *compactly imbricate* very unequal quite smooth and naked yellowish gr. and *herbaceous with scarious brown tips linear-lanceolate or linear, all narrow and finely acute or acuminate* mostly very plain or even and entire, *closely and adpressedly erect* with *the tips only of the outer spreading or recurved*; teeth of florets acute and smooth or naked.—*Phagnalon saxatile* DC. v. 396; WB. ii. 214; Gr. et Godr. ii. 95; RFG. xvi. t. 29. f. ii.; Willk. et Lange Fl. Hisp. ii. 57. *Conyza saxatilis* Linn.! Sp. 1206; Lam. Dict. ii. 87; Cavan. in Anales de Cienc. (Madr. Jun. 1801) No. 10. p. 87. no. 133 (tom. iv.); Brot. i. 358; Pers. ii. 428; Buch 194. no. 258; Barrel. Ic. t. 425, 426.—Suffr. per. Mad. reg. 1, 2, 3, ccc; PS. reg. 1–4, c; ND. c; GD. cc; SD. ccc. On dry sunny rocks everywhere chiefly below 2000 ft. March–Dec.—A small inconspicuous wholly scentless shr. 6–18 in. high with hard stiff woody brittle slender subelongate and spreading decumbent or ascending somewhat loose or straggling closely cottony snow-w. branches. L. 1–3 in. long, 1–3 lines broad, entirely sessile or semiamplexicaul not decurrent, thickly crowded squarrosely recurved and persistent downwards, drying on the pl., dark gr. and glabrescent above, snow-w. and densely cottony beneath. Ped. almost uniformly solitary and only sometimes geminate or forked when terminal,

rather numerous, and, though scattered or dispersed down the branches, rising subcorymbosely towards their ends 2–6 in. above the l., 2–6 in. long very slender but stiffly erect and nearly or quite straight, cottony-floccose, a little thickened close beneath the heads but not so gradually or so much as in *G. calycinum* (Cav.) or *G. rupestre* (L.). Heads 3–5 lines long, 2–3 broad; in fl. oblong a little swollen at the base, afterwards contracted upwards and oblong-ovate; female fl. of margin pale straw or lemon-y. in a broad outer ring; perfect fl. of disk pale dull ochre-y.; the teeth of all acute quite smooth and naked or beardless. Scales of inv. quite smooth and shining light gr. with dark-brown scarious tips, closely and tightly adpressed, the outer with the tips only recurved spreading or reflexed, the inner narrower paler more acuminate and altogether compactly and adpressedly erect and as long as the outer female florets; all mostly flat even and entire, but with the scarious edges upwards sometimes crisped or subundulate and sometimes here and there toothed. Pappus nearly w. a little stiffish simply scabrous sessile. Recept. naked papillary. Ach. hairy, frequently abortive.

Barrelier's t. 425 exactly represents the pl. as it very frequently occurs browsed down by goats &c. with smaller shorter and broader leaves.

In drying all the scales of the inv. become somewhat lax or loosely erecto-patent; but in the live pl. they are always closely and tightly or compactly adpressed, with the brown tips only free and recurved.

Gnaphalon (Γνάφαλον) is quite distinct enough from *Gnaphalium* to render entirely inexcusable and intolerable Cassini's puerile anagrammatic transformation of it into *Phagnalon.*

2. G. RUPESTRE (L.).

Suffr. dwarfish sparingly branched, branches *stout robust and mostly short* and thickly leafy, closely and adpressedly snowy-tomentose; l. sessile or half-amplexicaul not decurrent, the upper erect straight and stiffish thickly tomentose linear with strongly revolute entire margins, the lower lanceolate or elongato-spathulate much attenuated downwards, glabrescent above, often remotely repand-toothed, sometimes squarrose or reflexed; ped. *geminate or ternate* subcorymbose and *terminal or nearly so,* rarely solitary, 1-fld. slender elongate; heads in bud *globose or hemispherical,* in fl. and fr. *shortly and broadly oblong or cylindric* large *as broad as long*; scales "adpressed," loosely imbricate when dry, very unequal, quite smooth, *wholly brown and stiffly scarious or even coriaceous,* the middle and outer

broadly oblong-spathulate or obovate mostly obtuse or lacerato-truncate, sometimes acute or mucronate much crisped or undulate and lacerato-denticulate upwards at the edges, the *inner scales always narrow linear acute or acuminate* entire; teeth of florets *acute and smooth or naked.*—*Conyza rupestris* Linn. Mant. 113; Cavan. in Anal. Cienc. iv. No. 10. p. 87. no. 132. *C. saxatilis* β Lam. Dict. ii. 87. *C. Tenorii* "Spr." Guss. Fl. Sic. ii. pars 1. p. 500.—Suffr. per.—Varr. :—

a. Outer and middle scales of inv. *subobtuse and mucronate, or acute and broadly obovate or oblong-lanceolate*; inner or upper linear *acuminate.*—*Conyza rupestris* Desf. ii. 268; Pers. Syn. ii. 428. *C. saxatilis* Lindl. in Fl. Gr. ix. p. 48, t. 862 (not Linn.). *C. geminiflora* Ten. Fl. Nap. ii. 213, t. 77. *C. Tenorii* var. *b*, Guss. l. c.—PS. reg. 4, rr. Rocky summits of several peaks in PS., Pico d'Anna Ferreira, &c. April–June.

β. Outer and middle scales of inv. *very obtuse or rounded and broadly spathulate or ligulate*; inner or upper linear *acute.*—*Phagnalon rupestre* DC. v. 396; WB.! ii. 215; RFG. xvi. t. 29. f. iii.; Lowe Pl. Mog. in Linn. Soc. Journ. v. p. 31. no. 70; Willk. et Lange Fl. Hisp. ii. 58; Bourg.! Pl. Hisp. (Barcelona) and Welw.! Pl. Lusit. Exsicc. in BH. *Conyza rupestris* Smith! in Herb. Linn. *C. Tenorii* (Spr.) Huet du Pavillon! Pl. Exsicc. Sicil. in BH. *Phagnalon Tenorii* Presl Fl. Sic. i. xxix; Gren. et Godr. ii. 95.—Mad. reg. 2, rrr. Top of the Cabo Girão. April, May.—An altogether stouter more robust and dwarfish less-branched pl. than *G. saxatile* (L.), with fewer shorter thicker and mostly more erect less straggling branches from 3 or 4 to 8 or 10 in. long. L. 1–1½ in. long more densely crowded upwards and erect not squarrose, the lower more broadly lanceolate or elongato-spathulate. Ped. shorter mostly geminate and almost always terminal. Heads larger with more numerous florets and a broader disk, hemispherical 4–5 lines long and broad. Scales all scarious mostly altogether brown, but in *α* sometimes pale yellowish or greenish with the tips and midrib brown. In dried sp. they are somewhat lax or loosely erect, but not more so than in *G. saxatile* when dried, in which they are originally very closely adpressed; and I have not observed them in the living pl. By Gusson they are said to be adpressed, and by Grenier and Godron to be "toutes appliquées."

There is a true spec. of var. *β* in the Linn. Herb., but unnamed by Linnæus, and with merely the numerals 36 inscribed on it in ink, which is the number on the named sheet of his true *Conyza saxatilis* to which it is pinned. The name *rupestris* has been subsequently written on this unnamed sheet in pencil by Sir J. E. Smith. Thus, although Linnæus plainly

had confounded it originally with his *C. saxatilis*, it may fairly be presumed that it was at least partly his authority (possibly his very "H. U." spec.) for the *C. rupestris* of his subsequent Mantissa, and that he merely neglected or forgot to make the proper alteration in his Herbarium. This however, although probable, seems not quite to warrant the insertion of a ! after his name in quoting the Mantissa.

3. G. CALYCINUM (Cav.).

Habit and foliage like the last with stout robust short branches and linear erect straight crowded very entire upper l. with strongly revolute margins; ped. distinctly thickened upwards, mostly geminate; heads in bud depresso-globose *umbilicate*, in fl. *ventricosely hemispherical* large as broad as long; scales *all loosely imbricate* erect pale brown and *membranaceo-scarious* with plicate undulate or lacerato-serrate edges and *all* or about the lower half of them *broadly rounded oval obovate or shortly spathulate and very obtuse or retuse, the inner ligulate or oblong and lacerato-truncate*; teeth of all the florets *obtuse glandular-pubescent or tipped with a tuft of glandular short hairs.* —*Phagnalon calycinum* DC. ! v. 397. *P. Bennettii* Lowe ! MS. olim. *Conyza calicina* Cavan. in Anal. Cienc. iv. No. 10. p. 87. no. 134. *C. rupestris* Madeira Fr. Masson 1777 in BH. !; Buch ! 194. no. 259 (not Linn.).—Suffr. per. Mad. reg. 1, rrr. Dry sunny rocks at or near the south end of the ridge or crest between the Quinta do Valle or Ribeirinho and the Rib. de João Gomes a little above Funchal at an elevation of about 400 ft. Feb.–June. On this spot alone I found first in Febr. 1827 a very few pl. only, and this for several years successively, of which I sent spec. to the late Prof. De Candolle and to HB. and HK., which are still extant. But the locality has been since completely changed by cultivation; and the pl. has escaped all later researches on the spot or elsewhere in Mad. except those of Dr. Findley, from whom there is a small but excellent spec. in HK.

The following description was taken in 1832 from fresh or living spec.

Whole pl. entirely scentless and without any "odor gravis," ascribed by Linnæus to his *Conyza rupestris*, but which I never observed in the Mad. *G. rupestre* or *G. saxatile*; larger and stouter than the latter in all its parts and less branched or bushy. Branches fragile often somewhat straggling or irregular but mostly straight short erect and stiff or rigid, white and tomentose especially while young. L. perfectly sessile or subsemiamplexicaul but in no degree hastate or decurrent,

slightly tomentose on both sides with the midrib w. but presently becoming more naked or glabrescent than in *G. saxatile* (L.), 1½–2 in. long, ½–1½ line wide, the upper crowded stiffly erect thickish and rigid very straight and entire with strongly revolute margins; the lower broader and flatter erecto-patent not revolute or waved at the margins; on the whole all are stiffer longer and narrower than in *G. rupestre* above, in which they rarely exceed an inch in length and are of a softer thinner substance with at least the lower flaccidly or loosely spreading or recurved. Ped. slightly cottony gradually thickened upwards and distinctly swollen beneath the heads which are depressedly globose in bud, semiglobose in fl., 4–5 lines broad and high, swelling out abruptly, like that of a *Sonchus*, at the base and of a thick short squab instead of pyramidal or slender ovate-oblong more or less elongated shape; disk broad with numerous florets. Scales of inv. wholly scarious or membranous (not coriaceous or rigid) light brown or pale chestnut or fawn-colour with a darker stripe up the middle, all altogether loose but erect and not even their tips recurved or spreading; the outer of a short abrupt broadly spathulate or rounded shape, the innermost ligulate and lacerato-truncate. Female florets of the margin numerous in a broad band or ring sulphur or lemon-y. with a very long slender tube from which are exserted the 2 divaricate branches of the style; perfect fl. of disk or rather their anthers golden-y.; the 5 teeth of all the fl. obtuse and either tipped with a tuft of glandular short hairs or all over glandular-pubescent. Pappus sessile nearly smooth. Ach. hairy stipitate. Recept. quite naked papillose. When the seeds are fully ripe, the scales of the inv. become altogether reflexed back upon the ped. In *G. saxatile* (L.) and *G. rupestre* (L.) they are merely horizontally spreading.

P. Tenorii Gren. et Godr., by the scales of the inv. "*toutes* arrondies au sommet," agrees somewhat better with *G. calycinum* than with *G. rupestre*: but the rest of the description rather, and the synonyms entirely, belong to the latter.

Seeing the great variableness of *G. rupestre* on the one hand, and the rare and casual occurrence of *G. calycinum* on the other, I have sometimes doubted whether the latter were more than an extreme form of var. β of the former. The difference however above noted in the teeth of the florets, if corroborated and found constant, would be quite decisive.

The following is an extract from a letter dated "Genève 15 Févr. 1834" from the late Chev. De Candolle about this pl. "Quant au no. 231" (*P. Bennettii* Lowe Mad. MS. olim)

" J'avais été conduit comme vous à le distinguer du Phagnalon le plus commun dans tout le bassin de la Méditerranée ; celuici est certainement *Conyza geminiflora* de Tenore, *Conyza Tenorii* de Sprengel, *Conyza tomentosa* de Shaw et par conséquent *Conyza rupestris* de Linné : il devrait donc garder le nom de *Phagn. rupestre.* Le vôtre reste donc nouveau, propre à Madère et peutêtre se retrouve-t-il aux env. de Mogador d'après un échantillon du voyage de Broussonet sans localité précise *. Je l'avais d'abord nommé *Phagn. scariosum* d'après la nature de son invol. qui contraste avec les écailles rigides et coriacées du *Phagn. rupestre.* Si vous teniez au nom de Bennettii je l'adopterai, mais dans mon opinion s'il devrait recevoir un nom d'hpnneur je préfèrerais celui de *Phagn. Lowei.*"

The name *Bennettii* had been designed for it by me in compliment to my friend J. J. Bennett Esq. who had previously (1831, 1832) assured me of its being " totally distinct from *Conyza rupestris* L., though " identical with a Mad. spec. from Masson " originally so named in BH."

Tribe IV. *Senecioneæ* Cass.

6. Senecio Less. (*Senecio* and *Cineraria* L.)

Sect. 1. *Eusenecio* Gren. et Godr.—Heads cylindric calyculate. Ligules 0 or very short and revolute. L. pinnatilobate. Fl. y. discoidal with or without ray.

†1. S. vulgaris L. **Groundsel.**

Scentless glabrescent or only partially cobwebby-hairy not viscous ; st. erect branched from the base soft or succulent ; l. sinuately pinnatilobed smooth or more or less cobwebby, lobes short broad subremote subequal flat obtuse denticulate ; fl. dispersed in numerous few-fld. cymes ; scales of inv. smooth, of calycle (10–20) adpressed $\frac{1}{4}$–$\frac{1}{3}$ length of inv. their upper half black ; flts. mostly all tubular ; ach. adpresso-pubescent.—Linn. Sp. 1216 ; Müll. Fl. Dan. t. 513 ; Brot. i. 388 ; EB. t. 747 ; Sm. E. Fl. iii. 428 ; DC. vi. 341 ; WB. iii. 318 ; Koch 425 ; Bab. 181 ; Gren. et Godr. ii. 111 ; RFG. xvi. t. 68. f. 1 ; Willk. et Lange Fl. Hisp. ii. 123. *S. viscosus* Buch ! 194. no. 261 (partly ; not Linn.).—Herb. ann. Mad. reg. 1, 2, c ; PS. reg. 1, 2, $\frac{r}{2}$. Not seen in the Desertas. In gardens, vineyards, fields

* The only Gnaphalon or Phagnalon found by me at Mogador during a few days' visit in 1859 was *G. rupestre* (L.).

and cult. ground about Funchal and most towns or villages in Mad. but everywhere sparingly. In PS. in fields beyond Camacha. Spr. chiefly.—Scentless erect branched from the base leafy often bushy 6–12 in. high altogether somewhat succulent, mostly in some degree thinly and loosely cobwebby or cottony-hairy, rarely quite bald. St. light gr. angular soft or fleshy. L. of a somewhat shining full gr. with often somewhat of a leaden hue, thickish, with flat not revolute margins, the lower attenuate downwards into a stalk, the upper broadly auriculate-amplexicaul. Heads erect or drooping 3–4 lines long, 2–2½ broad cylindric-oblong mostly entirely rayless, in small terminal and lateral cymes, short broad and thick in bud. Calycle distinct, its scales short subequal and conspicuously black-tipped. Scales of inv. linear acuminate gr. with membranous w. edges smooth slightly bearded and subdenticulate at the black or discoloured tip. Fl. y. discoidal, the outer a little irregularly 5-cleft or the outer segm. larger but scarcely ligulate, rarely with an outer single row of minutely revoluto-ligulate flts. (*β radiatus* Koch 426, Bab., Willk. et Lange l. c.; *S. denticulatus* Nolte, non Müll. Fl. Dan. t. 791; *S. lividus β denticulatus* DC. vi. 343, excl. syn. Müll.). Recept. naked smooth pustulate or mamillate. Ach. narrowly cylindric-oblong or elliptic many-ribbed brown clothed with adpressed short silky-w. pubescence. Pappus sessile softly pilose pure w. copious 3–4 times the length of ach.

In BH. is a sheet ticketed by Solander (*propriâ manu*) "Senecio viscosus Linn. Sp. pl. 1217. Mscr. Madeira." It is the original authority for *S. viscosus* of Buch's Mad. List 194. no. 261. It contains two spec.: one in fl. about 4 in. high is unquestionably *S. vulgaris* L.; the other (not in fl.) 18 in. high is rather, by its scaly or furfuraceous pubescence, the shape of the young fl.-buds, and mode of grooving of the stem, *S. sylvaticus* L.

2. S. SYLVATICUS L.

Strong-scented furfuraceo-pubescent or furry-tomentose and cobwebby subviscid; st. erect *straight virgate simple hard firm and stiff* branched upwards only; l. subauriculato-semi-amplexicaul deeply sinuato-pinnatilobed or pinnatipartite, lobes subequal regular narrowish-oblong short remote distinct and parallel, coarsely toothed, the margins revolute, the lower attenuately stalked; cymes normally ample many-fld., heads numerous crowded rather small conical imperfectly calyculate subglandular-puberulous; calycle irregular inconspicuous very short of 3–5 minute adpressed unequal linear-setaceous scales

$\frac{1}{5}$–$\frac{1}{4}$ the length of those of the inv. and like them sometimes black-tipped; fl. of margin with a very short inconspicuous revolute ligule; ach. distinctly ribbed and angular finely and shortly adpresso-pubescent.—Linn. Sp. 1217; Brot. i. 388; Pers. ii. 434; EB. t. 748; Sm. E. Fl. iii. 430; DC. vi. 342; Koch 426; Coss. et Germ. Fl. Par. ii. 418; Gren. et Godr. ii. 111; RFG. xvi. t. 69. ff. ii, iii; Willk. et Lange Fl. Hisp. ii. 123. *S. viscosus* Buch ! 194. no. 261 in part (not Linn.). *S. viscosus* var. *hypolcuca* Holl's List ! i. e. "Holl et Reich. in Ratisb. Fl. 1830, p. 382" (not Linn.). *S. lividus* DC. ! vi. 343 quoad pl. Mad. solum ejusque syn. Holl et Reich. (not Linn.).—Herb. ann. Mad. reg. 1, 2, 3, ccc. GD. reg. 2, $\frac{r}{2}$. Sunny waste ground, banks and mountain pastures chiefly above 2000 ft. everywhere, springing up especially in woodlands and on mountain-sides freshly cleared by burning. About the Valle (Funchal), S. Martinho, Mount Camacha, mountain pastures up the Caminho do Meio, thickets of *Vaccinium* below the Ice-house, Rib. da Metade, Pico Ruivo up to the very top, whole plain of the Paul, P^{to} da Cruz &c. Febr.–Oct.—Varying wonderfully in luxuriance and stature from 1 inch, with only 1–3 or 4 heads of fl., to 1 or even 3 or 4 ft. high with ample many-fld. cymes, but otherwise in habit constant. Whole pl. rather pale or dull gr. and fetid with the strong pungent scent of *Ballota nigra* L., clothed with short somewhat scaly or furfuraceous cottony crisped pubescence and slightly viscid. St. simple branched only upwards into the terminal cyme, clothed all the way up with at first stalked then sessile or half amplexicaul more or less auricled l. 1–3 in. long and 3 or 4–12 lines broad, remotely equidistantly and regularly pinnatilobate, the lobes coarsely and somewhat bluntly sinuate-toothed with revolute margins. Heads always erect 3–4$\frac{1}{2}$ or even 5 lines long, 1$\frac{1}{2}$–2 lines broad, at first narrow cylindric-oblong, then elongato-conoidal, swollen at the base, subglanduloso-puberulous, on slender thickly but shortly glandular-pubescent viscous ped. Scales of inv. and of calycle linear acuminate gr. herbaceous scarcely fleshy minutely bearded at the tip which is about as often black or purple as undiscoloured or herbaceous; nor is there any regularity of correspondence in the Mad. pl. between either of these characters and any other variations in pubescence, stature, station or luxuriance. Fl. y. apparently discoidal and like those of *S. vulgaris* L., but always with an inconspicuous ray of short revolute remote ligules. Ach. dark coffee-brown or black, one line long, linear or narrowly elliptic-oblong angular and many-ribbed or striate, covered with short w. erect subadpressed silky pubescence. Pappus sessile softly pilose pure w. smooth copious, scarcely more than twice the length of ach. Recept. convex naked alveolate, the angles of the cells toothed. Scales of inv. strongly reflexed at last.

This is undoubtedly the normal form (with straight stiffly erect hard wandlike st. and more finely and remotely lobed less conspicuously auricled l.) of *S. sylvaticus* L.,—though spec. of it, sent by me in 1832 to the late Chev. De Candolle as *S. lividus* Smith, were referred by him in the Prodr. l. c. to *S. lividus* L., a distinct sp., generally diffused on the continent of Europe though not found hitherto either in Britain or Mad., with thicker more robust and succulent soft st., larger less deeply divided more broadly lobed and auricled l. and much larger fewer heads in somewhat lax not densely crowded corymbs.

S. lividus Sm. (Sow. EB. t. 2515), to which I had formerly referred such spec. of the Mad. pl. as had their involucral scales entirely gr. and not discoloured at the tips, is merely a more loosely branched and succulent luxuriant state or var. β of *S. sylvaticus* L. with more broadly lobed and largely auricled l., and has not really occurred in Mad. Nor has *S. sylvaticus* L. in either state been found in the Canaries—which is the more remarkable from the almost universal diffusion of the normal form of it in Mad.

Sect. 2. *Jacobæa* Tournef.—Heads campanulate calyculate. Flts. of margin ligulate, ligules exserted spreading. L. mostly pinnatilobate. Fl. y. radiate.

3. S. INCRASSATUS Lowe. *Doiradinha.*

Quite scentless smooth and fleshy low and dwarfish, bushy, leafy; st. sharply angular short erect branched or sometimes simple succulent; l. thick and fleshy crowded sinuately pinnatilobed, lobes toothed pinnatifid subacute, their margins revolute; lower l. attenuately stalked, upper amplexicaul dentato-auriculate; heads moderately large in terminal close crowded large many-fld. cymes; ped. much thickened and fleshy upwards multibracteate; calycle indistinct irregular, scales few (6–10) very short lax with the tips black or discoloured; all the scales and bracts of ped. gibbous and fleshy at the base; ligules of ray conspicuous few (6–10) short broad and truncate or obtusely suboval or ovate, about half the breadth of disk, at first spreading, then reflexed or revolute; ach. narrow linear-cylindric elongate very slightly or not at all attenuate at the base, finely and shortly adpresso-pubescent.—Lowe Novit. 16 or 538. *S. crassifolius* β *Lowei* DC. ! vi. 344.—Herb. ann. Mad. reg. 1, r; PS. reg. 1, 2, ccc; ND. r; GD. r; SD. $\frac{c}{c}$. In Mad. at the top of the Brazen Head and all about the Fossil-bed at

Caniçal only. In PS. everywhere about the town in all the sandy region, Rib. de Cochim, Fonte d'Arêa, &c. In hot calcareous sand everywhere except on the Brazen Head, where it flourishes equally in a strong red clay. March–June (Dec. also in PS., S^{r} Moniz).—A low bushy corymbosely branched thickly leafy pl. mostly 2–6 in. high, rarely 6–12, of a light shining bright gr. (never at all glaucous) and altogether smooth rigid fleshy stiff and brittle, very sharply angular or almost winged. L. 1–2 in. long, half as broad, thick stiff and brittle subbipinnatifid, lobes subremote distinct inciso-toothed, teeth mostly acute, the margins revolute. Fl. conspicuous half an inch in diameter bright full golden-y. in large many-fld. handsome cymes; ped. much thickened and fleshy upwards, granulated or tubercled with numerous scattered fleshy bracts becoming more crowded upwards, but not forming any distinct calycle; all the br. ovato-lanceolate or ovato-linear, dilated sessile or semiamplexicaul fleshy and singularly gibbous or tumid at the base, finely acuminate black or discoloured at the tips; inv. coloured i. e. pale greenish y. or lemon-y., with a dark or purplish-gr. ring at top; scales linear with pale membranous edges, gibbous and fleshy at the base, subpuberulous upwards and minutely bearded or pubescent at the tips. Heads shortly oblong or cylindric erect 2–3 lines long, 3 lines broad at top, many-fld., 7 or 8- (mostly 8-) rayed; ligules of ray $1\frac{1}{2}$–2 lines long, 1 line broad, either shortly oblong or suboval, truncate or obtuse, soon reflexed and more or less revolute; disk convex squarrose. Recept. small pustulate, sometimes alveolate, with the margins of cells raised 5-toothed or -angled. Ach. very small and narrow almost filiform, scarcely 1 line long or half a millim. broad, oblong-linear straight truncate at both ends, light brown, thickly clothed in lines with short upright silky-w. hairs. Pappus sessile softly pilose silky pure w., copious, about twice the length of ach., caducous.

The very distinctive and unvarying characters of this gay and handsome little pl. are so much lost and obscured in drying, that the spec. sent by me in 1832 to the author of the Prodromus was referred by him as a var. to *S. crassifolius* Willd. (a common Lanzarotan sp. in vineyards and cult. ground remote from the sea), from every form of which the Mad. pl. is certainly distinct. Though not found in the Canaries, I have specimens from the Salvages obtained by the kind exertions of the Barão do Castello de Paiva.

††Sect. 3. *Kleinanthus* Lowe. Heads cylindric imperfectly calyculate few-fld. Ligules 0 or few.—Wholly

smooth. St. mostly shrubby and climbing. L. simple undivided palmately nerved mostly angularly lobed and stalked; petioles auriculato-stipulate. Fl. y. discoidal or few-rayed. Ach. smooth.—Mostly Cape species.

††4. S. MIKANIOIDES Otto.

St. frutescent much branched and thickly matted climbing; l. on long petioles fleshy angular acutely 3–7-lobed roundish-reniform deeply notched or cordate at the base, petioles mostly longer than the l., the lower auriculate with very shortly stalked or nearly sessile semiorbicular or reniform entire leafy stip. at their base; cymes axillary and terminal many-fld. crowded on short somewhat leafy axillary stalks or side-shoots towards the ends of the branches, scarcely longer than the l., forming an irregular interrupted oblong terminal panicle; ped. sparingly and loosely subulato-bracteate upwards, the upper 2–4 br. constituting the calycle; tips of br. and scales of inv. withered or discoloured black or purple; heads discoidal 10–12-fld., florets all perfect rather large and prominent; scales of inv. 8.—Harv. and Sond. Fl. Cap. iii. 402. *S. scandens* DC. vi. 404 (not Don, Juss., Wall., Ham., nor *Cacalia scandens* Thunb.).—Suffr. per. Mad. reg. 1, perfectly naturalized, ccc. Banks and hedges, about Funchal and its neighbourhood everywhere; behind the church at Agua da Pêna, at P^{ta} do Pargo, P^{ta} Delgada, Seixal &c.; and in vast profusion, forming thick matted beds 100 yards long and 20 broad or more, at Rib. Fundo on the sides of the bed of the stream above the village. March–June, but at most seasons.—St. slender flexuose succulent but stiff hard and wiry, brown and woody downwards, climbing or spreading in thick close entangled masses either on the ground or up any support 6–10 ft. or more. Whole pl. of a light shining gr. perfectly smooth succulent or somewhat fleshy. L. 2 or 3 in. in diam. a little broader than long, in shape ivy-like with very acute triangular entire lobes. Petioles 2 or 3 (1–3) in. long, curved or flexuose, their auricles fleshy like the l., sparingly and shortly subciliate. Fl. rather handsome and conspicuous though always rayless, fragrant but not agreeably, bright golden y. Inv. narrow-cylindric 2 lines long, 1 line broad pale or light bright gr., often a little darker at top and bottom. Br. of ped. and calycle loosely erect fleshy linear-subulate, their tips incurved and withering. Scales linear herbaceous-succulent gibbous-fleshy at the base, quite smooth, the tip only distinctly barbulate. Flts. twice the length of scales or inv. exserted tubular evenly 5-cleft. Styles and anthers far-exserted long conspicuous; branches of style at first divergent then revolute, truncate and pubescent at the tips. Recept. very small alveolate; cells 5-angular with much-raised pale membranous edges. Ach. very small and narrow linear filiform subpubescent with

a few very short erect w. hairs in lines along the ribs reddish-brown (burnt sienna) truncate at each end. Pappus sessile pure w. softly pilose copious, 3–4 times the length of ach.; epig. disk dilated w. conspicuous.

The rapid diffusion in Mad. of the present pl., not introd. or at least observed in gardens at Funchal before 1845, is scarcely less remarkable than that of *Eupatorium adenophorum* Spr. above mentioned; like which pl. also it is useless for all but ornamental purposes, such as covering unsightly banks or walls &c., for which its easy rapid densely matted growth and handsome ivy-like light gr. foliage qualify it admirably. It is a native of S. Africa and comes originally from the Cape.

Sect. 4. *Pericalles* DC. Heads campanulate without calycle many-fld. Flts. ligulate, ligules not numerous flat spreading.—St. shr. or herb. not climbing. L. simple palmately nerved cordate mostly angular tomentose beneath and stalked; petioles auriculato-stipulate. Fl. conspicuously but not many-rayed mostly purple or w., rarely y. Ach. subpubescent.—Macaronesian (Can., Mad. and Açor.) species.

5. S. AURITUS (Hérit.). *Erva de Coelho.*

St. shrubby erect, branches elongate flexuose floccosely subtomentose; l. stalked cordate roundish subangular, doubly callosocrenate-toothed closely snowy-tomentose beneath, cobwebby-glabrescent above; petioles tomentose leafy auricled at the base, auricles entire semicircular or broadly lunate snowy-tomentose beneath; cymes fork-branched ample lax smooth or cobwebby-glabrescent, ped. bracteolate; inv. mostly naked smooth, scales 12 ribbed or striate, ligules 5 broad and rather short.—*Cineraria aurita* Hérit. Sert. Angl. 26. t. 31; Ait. Hort. Kew. (ed. 1) "iii. 220;" BM. t. 1786; Pers. Syn. ii. 439; Poir. Suppl. ii. 262; Spr. iii. 546 (not Andr.). *Cin. populifolia* Buch 194. no. 262 (not Hérit., Lam., Vent.). *Senecio maderensis* DC.! vi. 409.—Shr. per. Mad. reg. 3, cc; PS. reg. 4, rrr. On rocks almost everywhere from 3000–5000 ft., Rib. de S^{ta} Luzia, R. Frio, da Metade, de S. Jorge, Curral das Freiras, &c. In PS. only on the summit of Pico Branco. May–July.—A sparingly branched shr. with long straggling flaunting or declining woody but somewhat slender and brittle flowering-branches 2–4 ft. long. L. 1–4 in. long $\frac{3}{4}$–3 in. broad on petioles about half as long, somewhat thin and flaccid, elegantly and regularly double-toothed, the ultimate teeth fine and delicate. Auricles very entire, sessile, the upper rather large, 4 or 5 lines broad, 2 or 3

long, lower evanescent or 0. Cymes terminal 6–12 in. broad, branches widely forked remote straggling with an auricled-stalked l. at each main division; ultimate cymes 4–12-fld., ped. slender erect with small linear-acuminate erect or loosely erect br. all the way up but not collectedly at the base of the inv. which is light gr. dark purple or blackish at the base. Scales strongly 3-ribbed or grooved oblong acute, the tips dark-purple, of the outer scales subcuspidate and quite smooth, of some of the inner less acute or even obtuse and distinctly barbulate-pubescent or fimbriate. Fl. about half an inch in diam., handsome but most disagreeably scented; flts. of both disk and ray rich bright purple varying a little in intensity; ligules of the ray rather paler than the convex disk, 2–3 lines long or about equal to diam. of disk, half as broad. Ach. erecto-pubescent. Pappus w. silky rough. Recept. flat naked shortly setose or bristle-toothed.

Strictly peculiar and confined to Mad. and PS., where it is the sole representative of a group of several very similar Canarian sp. The Açores also produce one only, peculiar to themselves: the Cape Verdes not one.

Assuredly the name *auritus* from *Cineraria aurita* Hérit. (Sert. Angl., 1788) or from even *C. aurita* Ait. (Hort. Kew. ed. 1., 1789) properly belongs to this pl., being anterior both to *C. aurita* Andr. (Bot. Rep. 1797) = *Senecio cruentus* (Hérit.) and to *Sen. auritus* Willd. = *Sen. auriculatus* Desf. (not Vahl). The restoration of its old name to the Mad. pl. necessitates the imposition of a new one, *S. Fontainesii*, after its original discoverer, on *S. auriculatus* Desf. (*S. auritus* Willd.), *S. auriculatus* Vahl having a prior claim to *S. auriculatus* Desf.

Kleinia repens (L.) DC. vi. 337, called "Balsamo," is not an uncommon inmate of cottage-gardens, the resinous juice of its leaves being a favourite and really efficacious remedy for cuts or wounds. It is often seen hanging profusely over walls, but can scarcely be considered fairly naturalized.

Tribe V. *Cotuleæ* Less.

††7. COTULA L.

††1. C. CORONOPIFOLIA L.

Smooth herbaceous; st. creeping ascending or procumbent and rooting downwards; l. linear lanceolate stem-clasping and sheathing at the base irregularly laciniato-pinnatifid or pinnatisect and toothed; fl. solitary terminal subglobose

or hemispherical.—Linn. Sp. 1257; Fl. Dan. t. 341; Lam. Dict. ii. 136, Ill. t. 700. f. 1; Pers. Syn. ii. 464; Spr. Syst. iii. 497; DC. vi. 78; Koch 407; RFG. xvi. t. 107. ff. i, ii; Willk. et Lange Fl. Hisp. ii. 91.—Herb. ann. Mad. reg. 1, rrr. P^ta do Sol, moist gutters in the Plane-tree Passeio or walk at the back of the beach, June, July 1865, S^r J. M. Moniz.—St. succulent thickish procumbent and copiously rooting downwards, the ends ascending, sparingly branched 6–12 in. long. L. shining somewhat fleshy 1–2 in. long laciniato-pinnatifid upwards, sharply inciso-serrate downwards, clasping the stem with a short striated membranous complete sheath 1–2 lines long at their base. Heads 3 or 4 lines in diam. golden-y. rayless, on solitary terminal erect ped. 1–2 in. long. Inv. shallow saucer-shaped. Recept. flattened.

Tribe VI. *Artemisieæ* Less.

8. Artemisia L.

Sect. *Euartemisia* Gr. et Godr. Cor. inserted at top of ovary. Stigmas filiform or simply clavate. (Recept. villous or hairy; inv. hemispherical; fl. of disk perfect.)

1. A. argentea Hérit. *Losna.*

Shr. erect silky silvery-grey or w.: l. short and broad subpalmately 1–2-pinnatisect, the segm. linear or linear-lanceolate obtuse or subobtuse; heads stalked cernuous rather large depressedly globose or convex-hemispherical, in unilateral erect racemes forming large close crowded many-fld. pyramidal or thyrsoidal terminal leafy-bracteate panicles; scales of inv. all wholly herbaceous silky-tomentose obtuse, the outer oblong, inner spathulate or oval rounded.—Hérit. Sert. Angl. 22. t. 28; DC. ! vi. 120. *A. arborescens* Buch 194. no. 253 (not Linn.)—Shr. per. Mad. reg. 1, rr; PS. ccc formerly, now rr; ND. ccc; GD. r. Here and there in cottage gardens about Funchal &c., but scarcely in Mad. wild except on sea-cliffs towards the S.W. of the island from Rib. Brava westward, at Paul do Mar, P^ta do Pargo, &c. In PS., formerly (1828–1832) almost covering in low bushes the dry stony limestone soil forming the surface of the flat-topped Ilheo Debaixo and I. de Cima, it is now confined to the sea-cliffs (as in the Desertas), having been all cut up for fuel by the Limestone-quarry-men. It occurs also rarely on the flanks of Pico Branco. May–Aug.—A low shr. 1½–3 ft. high, altogether w. or hoary-grey with a bitter aromatic scarcely pleasant scent when strongly rubbed or bruised, but not otherwise perceptible. Branches somewhat thick and brittle woody stiff subflexuose w. and leafy upwards. L. crowded spreading

or drooping, the old dried up l. persistent in thick reflexed tufts below the fresh terminal l., short (1½–2 in. long), nearly as broad, subtriangular in outline, deeply twice rarely thrice-pinnatipartite, their segments flat with a faint midrib, ½–¾ in. long 1–1½ line broad. Panicles 5 or 6 in. long, half as broad, pyramidal or thyrsiform, composed of numerous erect simple or compound branched rac. of stalked secund globose or semiglobose heads, 2 lines broad and 1¼ long, on curved ped. 1–3 lines long drooping on one side. Br. leafy simple linear at base of each ped. 1–6 lines long. Inv. w. and altogether tomentose; fl. dull dark golden y., smooth upwards, tube resinoso-punctate and sometimes hairy. Recept. setose or villous all over, convex and pulvinate when the hairs or setæ are fallen. Branches of style short pubescent at the tips, clavate in the perfect fl., filiform in the female of the margin.

Used occasionally in fomentations by the country people. It is assuredly Bòwdich's "Composita" &c. (Exc. in Mad. p. 87) found in the I. Debaixo.

The Canarian Incienso (*A. canariensis* Less.) much resembles this, but, besides other distinctive characters, has a very different strong and peculiarly pungent disagreeably aromatic scent, diffusing itself automatically all about. Schultz in WB. ii. 302 considers it, I think erroneously, a mere var. of *A. argentea* Hér. The Cape Verde *A. Gorgonum* Webb also closely resembles the Mad. pl. in habit, foliage and inflorescence, but recedes still further from it than the Can. pl.

Tanacetum Balsamita L. Sp. 1148, Brot. ii. 354, Koch 407 (*Balsamita vulgaris* W., *B. suaveolens* Pers. Ench. ii. 408, *Pyrethrum Tanacetum* DC. vi. 63) herb. per. with erceping roots or rhizomes, simple oblong-oval finely crenulate stalked pale greyish-gr. root-l. with a mint-like fragrance, and erect fl.-st. (very rarely thrown up in Mad.) with a terminal compound cyme of golden y. discoidal fl., is seen occasionally in cottage gardens. It is well figured in Gerard's Herbal (ed. 1.) p. 523. f. i. under the name of *Balsamita mas* or Costmarie. RFG. xvi. t. 104. f. ii. represents the pl. much more luxuriant and with larger greener l. than I have ever seen it in Mad.

†Tribe VII. *Hippieæ* Less.

†9. Soliva Ruiz et Pav.

†1. S. STOLONIFERA (Brot.).

Stoloniferous prostrate cespitose smooth or subpubescent; l. stalked pinnatipartite 5–9-lobed somewhat succulent or fleshy,

lobes subopposite subobtuse entire or rarely 1–3-toothed; heads sessile at the crown of the several root-stocks, araneoso-tomentose or thinly woolly; ach. smooth wedge-shaped with thickened broad transversely ribbed or rugose wings.—*S. Lusitanica* "Less. Syn. 268;" DC. vi. 142. *Hippia stolonifera* Brot. i. 373; ejusd. Phytogr. Lusit. fasc. i. (1801) no. 14; ed. 2 (1816) i. 72, t. 73. ff. 2, 3; Pers. Syn. ii. 497; Willd. iii. 2383. *Gymnostyles*? *stolonifera* Juss. Ann. Mus. iv. 262. *G. lusitanica* Spr. iii. 500.—Herb. ann. Mad. reg. 1, r. In paved roads, streets and garden walks in and about Funchal and in the Plane-tree Passeio at S^ta^ Cruz, running abundantly amongst the stones and often mixed with *Sagina apetala* L. First properly observed and identified by the Barão do Castello de Paiva in April 1860, though the little pl. found on the Mount road about the Valle in 1837 and mentioned in this work, supra p. 36, as a curious young state of *Senebiera didyma β pinnatifida* was most probably the present pl. Febr.–May.—A minute inconspicuous little pl. not above an inch high, the st. spreading and creeping close to the ground in small cespitose confluent patches, each 2–5 in. in diam. of a rather dark full-gr., marvellously resembling in habit and foliage *Senebiera didyma* (L.) β DC., though at once distinguishable by the want of all bitter biting taste, and by the simply pinnatilobate l. Stem slender filiform, rooting at the nodes. L. 2–5 lines long, 1–3 broad, with flattened slightly winged or margined petioles a little dilated upwards as long as or a little longer than the l. themselves. Heads large in proportion, about 2 lines in diam., much resembling those of *Trifolium tomentosum* L. or *T. resupinatum* L., dull hoary grey, mostly solitary but crowded towards the centre of the pl. Styles of the numerous female marginal fits., which occupy at least ¾ of the convex disk, distinct long and prominent simple or but slightly bifid at the tip. Scales of cup-shaped inv. distinct oblong obtuse shorter than the disk thinly herbaceous, with pale membranous tips and margins. Ach. large in proportion, ½–¾ line long, pale straw-col., auriculato-truncate and sinuately lobed with a tooth on each side at top, dorsally compressed with broad tumid spongy or corky margins which are very strongly plicato-ribbed transversely on the ventral or inner face and on the outer or dorsal similarly but more partially or incompletely ribbed or corrugated on the tumid rib-like edges or borders of the depressed body of the seed itself, with the edge of the wing sharp and thin. Style persistent abruptly winged or dilated at the base, rather longer than the ripe ach.

I subjoin the following note furnished by the Barão do Castello de Paiva at the time of its discovery: "In basalticis humidiusculis urbis Funchalensis ad vias lithostratas inter lapides,

necnon in humo ad ambulacra hortorum, immixtis nunc *Poa annua* L., *Oxalide corniculata* L., *Trifolii* sp., &c., nunc *Sagina apetala* L. &c.; ubique certe *Senebieræ didymæ* L. β *pinnatifidæ* statu præsertim juniore ante evolutionem gemmarum florentium, ob calathidia araneosa globosa foliorumque formam et divisiones simillima. Planta parum conspicua, quoad determinationem difficillima, obscura, facillime prætervisa v. confusa, vix vere indigena, copiose proveniens ad vicos urbis minus frequentatos hortorumque ambulacra humidiuscula hodie omnino hospitatur." I am now however strongly inclined to believe the supposed young state of *Senebiera didyma* (L.) β here alluded to, or at least that mentioned by myself at p. 36 *supra*, to have been really *Soliva stolonifera* itself.

††Tribe VIII. *Bellideæ* DC.

††10. BELLIS L.

††1. B. PERENNIS L. **Daisy.**

Root per.; st. several short simple leafy prostrate or subterranean; l. crowded in a flat radical tuft or rosette 1-ribbed obovate-spathulate somewhat abruptly contracted into the petiole, obsoletely crenate-toothed; ped. radical simple 1-fld.; scales of inv. subobtuse.—Linn. Sp. 1248; EB. t. 424; Sm. E. Fl. iii. 447; DC. ! v. 304; Koch 387; Bab. 172; RFG. xvi. t. 27. f. vi.; Willk. et Lange Fl. Hisp. ii. 31.—Herb. per. Mad. reg. 2, 3, rrr. S. Antonio da Serra, abund. in the courts and paved roads around the Church and Pilgrims' house, and extending some distance all round in the mountain turf; introd. originally with grass-seeds from England about the beginning of the present century by an English merchant, the late Mr. Willm. Casey, and thence transplanted to Camacha, and again by an English lady in 1851 or 1852 to the Fanal on the road from the Paul to Rib. da Janella, where in 1855 it was becoming naturalized in the turf. March–July.—Root-stock or rhizome blackish, furnished with numerous strong brown stringy roots or fibres, either simple or dividing into 2 or more short underground branches 1–2 in. long, forming at their ends a fresh tuft of roots and l. L. all radical or crowded at the base of the st. in a flat rose or tuft slightly stiff or fleshy, bright shining gr., pubescent, indistinctly 3-nerved, the 2 side-nerves faint and obscure, 1–2 in. long (including petioles), 5–7 lines broad. Fl.-stalks all radical slender 2–5 in. long ascending pubescent. Fl. scentless ½–¾ in. in diam., disk golden-y., ray w. mostly tipped with

rose, equal in length to breadth of disk. Scales of inv. dark bottle-gr. herbaceous subpubescent oblong half the length of ray. Flts. altogether smooth or without any beard at base. Ach. small elliptic flattened dorsally, subpuberulous, entirely without pappus or crest, brown with a distinct pale raised border like a pumpkin seed, and at least the outer with a strong raised dorsal midrib.

The pl. produce occasionally leafy prostrate aerial shoots sometimes rooting at the ends. But I have never met with either the true *B. sylvestris* Cyrill., *B. annua* L., or *B. azorica* Hochst. in Mad.

The double-fld. garden varr. with all the flts. ligulate (BM. t. 228) are very rarely seen in Mad.

Tribe IX. *Chrysanthemeæ* Less., DC.

†11. Pyrethrum Hall.

†1. P. Parthenium (L.). *Artemisia.* **Feverfew.**

Bushy and leafy, more or less pubescent; st. numerous straight erect stiff striated; l. all stalked subpubescent punctate flat pinnatisect, segm. pinnatifid and toothed, the upper confluent; cyme terminal lax leafy; inv. hemispherical, becoming finally umbilicate, scales with a prominent strong midrib; ligules short broad oblong-obovate or oval.—Sm. E. Fl. iii. 451; DC. vi. 58; Willk. et Lange ii. 100. *Matricaria Parthenium* Linn. Sp. 1255; Fl. Dan. t. 674; EB. t. 1231; Brot. i. 375; Buch 195. no. 266; Bab. 177. *Chrysanthemum Parthenium* Pers. ii. 462; Koch 418. *Leucanthemum Parthenium* Gren. et Godr. ii. 145. *Tanacetum* (*Pyrethrum*) *Parthenium* RFG. xvi. t. 101. f. ii.—Herb.-suffr. per. Mad. reg. 1, 2, r. Along the Levada in Rib. Frio; between Fajãa d'Ovelha and P^ta^ do Pargo; at Seixal, S. Vicente, P^to^ da Cruz, &c., mostly near cottages and nowhere beyond the range of cultivated ground. April–Oct.—St. numerous from the suffrutescent simple not creeping root-stock, 1–2 ft. high, forming a thick leafy mostly full-gr. but sometimes hoary or greyish gr. bush, simple hard and woody downwards, branched chiefly upwards. L. punctate on both sides but more distinctly beneath, varying from nearly or quite smooth and full bright gr. to subtomentose-pubescent and hoary, 1½–2 in. long, 1¼–1½ broad at base, triangular-ovate or ovate-oblong; pinnæ leafy ovate or oblong inciso-pinnatifid, ultimate segm. finely or sharply toothed. Cyme stiffly and subremotely branched, branches erect or erecto-patent; fl. moderately large ½ in. in diam. distinct or subremote, each on its somewhat elongated proper ped. which is

a little swollen upwards, not crowded or very numerous; disk y., ray w. Ligules 2–3 lines long, 1½ broad, about twice the length of inv. or less than diam. of disk. Outer scales of inv. linear-lanceolate acute herbaceous with the edges membranous, inner oblong blunt and scarious at the tip; the whole slightly cottony-pubescent. Ach. pale brown strongly ribbed subangular truncate at top with a broad flat disk surrounded with a narrow membranous crown or border. Recept. naked slightly convex.

The whole pl. has the bitter-aromatic scent and taste of Wormwood (*Artemisia Absinthium* L.), but in a pleasanter and less powerful degree. It is a common rustic remedy in Mad. as elsewhere.

††12. LEUCANTHEMUM Tournef. (pars.).

††1. L. VULGARE Lam. Ox-eye Daisy.

Rhizomes per. creeping; st. ann. rooting leafy and ascending at the base, then erect virgate sparingly branched or leafy, each branch produced into a long nearly leafless 1-fld. ped.; l. not fleshy, the lower and those of the barren shoots or rosettes crowded ovato-spathulate or oblong-spathulate attenuated into long petioles, subpinnatifid and crenate-toothed, the upper remote ligulate or linear sessile or semiamplexicaul sharply subinciso-serrate laciniately fringed or subpinnatifid towards the base; teeth remote distinct linear, the lower more elongate crowded and fimbriate-stemclasping; fl. large handsome, involl. shallow saucer-shaped, scales lanceolate gr., the inner oblong obtuse with a brown broad scarious border; tube of florets perfectly simple at the base.—Lam. Fl. Fr. ii. 137; DC. vi. 46; Gren. et Godr. ii. 140; Willk. et Lange ii. 95. *Chrysanthemum Leucanthemum* Linn. Sp. 1251; Brot. i. 377; EB. t. 601; Sm. E. Fl. iii. 449; Koch 416; Bab. 176. *Matricaria Leucanthemum* Desrouss. in Lam. Dict. iii. 731. *Pyrethrum Leucanthemum* Coss. et Germ. Fl. Par. 401. *Tanacetum Leucanthemum* RFG. xvi. t. 97. f. i.—Herb. per. Mad. reg. 2, r. Only within the last 10 or 15 years introd. accidentally at S. Antº da Serra, where it occurs here and there in patches as a weed in Mr. Blandy's garden and adjoining fields. First noticed by Fr. M. Norman Esq. May–July.—St. more or less dark purple 1–2 ft. high often simple and 1-fl., or only 2–5-branched, each branch 1-fld., smooth upwards, furry-pubescent downwards, angular stiff and rigid, erect or ascending, rooting at the base. L. all smooth shining dark gr., 1–2 or 3 in. long, reduced upwards to mere bracts, not fleshy but somewhat stiff or rigid. Fl. 1½–2 in. in diam. scentless; disk plano-convex golden-y., ray

pure w. Tube of fl. of disk not in the least produced or spurred downwards over the ovar. Ach. (in English spec.) black with 10 strong w. ribs and no trace of crown or border.

†13. MYCONIA Neck.

†1. M. CHRYSANTHEMUM Schultz in WB. *Pampilho.*

St. mostly *erect from the base* rarely diffuse or ascending, branches 1-fld.; l. *all undivided and equably and finely serrulate* the lower spathulate, the upper oblong ligulate or linear subacute; fl. solitary terminal, ped. *subelongate not thickened upwards*; ach. of ray *longer than broad with a tubular membranous crown as long as tube of cor.*, of disk *cylindric* equably 10-ribbed with a shorter crown.—Schultz in WB. ii. 247. *Chrysanthemum myconis* Linn. Sp. 1254; Desf. ii. 281; Brot. i. 379; Pers. Syn. ii. 463; Gr. et Godr. ii. 146. *C. Myconi* Buch 194. no. 264. *Pyrethrum Myconis* Mœnch, DC. vi. 61. (excl. var. γ); Seub. Fl. Az. 32. *P. Myconi* Spr. iii. 587. *Coleostephus Myconis* RFG. xvi. t. 95. f. iii.; Willk. et Lange ii. 105.—Herb. ann. Mad. reg. 1, 2, cc. Cornfields and waste ground by roadsides &c., up the Caminho do Meio; between S^ta^ Cruz and Machico; at P^to^ da Cruz abundant in the Rib. da Maiata; S^ta^ Anna in the Ilha; S. Jorge at P^ta^ Ferrovo and all along towards the Arco; S. Vicente towards the Encumeado &c., often mixed with *C. segetum* L. Apr.–Sept.—Root small branched horizontally. Whole pl. smooth always dark or full gr. and not at all glaucous, scentless, leafy. St. mostly erect from the crown of the root, straight firm and rigid, subangular and striate, 1–2 ft. high, erectly branched upwards, rarely from the crown with diffuse ascending red or purple branches. L. not at all fleshy, all amplexicaul, with fine pectinate teeth at the base, but not auriculate; lower 1–2 in. long, ½–¾ broad, spathulate or obovate-cuneate obtuse, attenuate downwards, the lowest into winged entire petioles which are still however stem-clasping, the uppermost subacute. Fl. 1–1½ in. in diam., of much the same size or even larger than in *C. segetum* L., but on longer more produced striated mostly reddish ped. equably slender to the top, uniform bright full golden y., each terminating a branch, not corymbose. Heads umbilicate; scales broad subequal, the outer obovate-oblong or ligulate obtuse, the inner spathulate, pale gr. herbaceous with a strong fleshy midrib, the tips brown withered scarious. Ligules longer and narrower (not shorter as said by Linn.) than in *C. segetum* L., 4–6 lines long, 2–3 broad, about as long as diam. of the flat or in fr. only slightly convex very crowdedly and compactly fld. disk. Ach. light brown smooth and shining 10-ribbed or striate, curved, cylindric, their tubular crown often dimidiate

or half-complete. Recept. naked, in fr. plano-convex or depressedly subhemispherical.

†14. CHRYSANTHEMUM L.

(*Xanthophthalmum* Schultz in WB. ii. 250.)

†1. C. SEGETUM L. *Malmequer* or *Pampilho.*

St. *subglaucescent* diffusely erect or ascending sparingly and *widely branched*, rarely erect from the base, each ultimate branch 1-fld.; l. *thickish stiff or somewhat fleshy* coarsely and irregularly inciso-toothed or gashed, *the lower dilated* and *subtrifidly pinnatilobate or pinnatifid upwards*, oblong or cuneate-oblong and finely toothed *irregularly* downwards; fl. solitary terminal, *ped. thickened upwards*; ach. *of ray obcompressed squarish-oblong nearly as broad as long.* — Linn. Sp. 1254; Desf. ii. 282; Brot. i. 378; EB. t. 540; Pers. Syn. ii. 463; Buch. 195. no. 265; Sm. E. Fl. iii. 449; DC. vi. 64; Koch 419; Seub. Fl. Az. 32; Bab. 176; RFG. xvi. t. 95. f. i; Willk. et Lange Fl. Hisp. ii. 134.—Herb. ann. Mad. reg. 1, 2, c. PS. reg. 2, r. Cornfields and waste ground; Loo-fields, S. Antonio, S. Martinho, S^ta^ Anna, S. Vicente, &c. April–July.— Root small simple clothed with fibres, vertical. St. 6–12 or 18 in. long, more or less diffusely straggling or ascending, and only perfectly erect from the base when drawn up amongst corn &c.; the branches pale and somewhat succulent, forked and spreading diffusely at wide angles. Whole pl. somewhat succulent smooth scentless. L. glaucescent, often decidedly and strongly glaucous, especially the lower, which form, before the fl. appear, a flat close-pressed rose; all stem-clasping and subauriculate, the lower 1–2½ in. long, ½–1 in. broad at the dilated trifidly pinnatisect ends, the lobes of which are again coarsely and irregularly cut or toothed, the teeth all acute. Upper l. lanceolate and simply cut or toothed. Fl. large and handsome bright full golden-y., on rather short naked striated subclavate hollow ped. at the end of each branch, not corymbose, 1 in. in diam. Heads umbilicate. Outer scales of inv. half-ovate or ovate-oblong gr. with scarious tips and edges, inner broadly oblong-spathulate and broadly scarious at top, all obtuse concave unequal fleshy pale greenish-y. glaucescent. Ligules y. very broad, about as long as diam. of disk or 4–6 lines long and 2 or 3 broad; disk convex. Ach. small brown obtusely ribbed incurved abruptly truncate at top without any crown, teeth or border; those of the ray broader but scarcely larger than the rest, with 3 dorsal and 3 or 4 ventral ribs all equal except the middle ventral rib which is more prominent, the sides or edges narrowly and sharply winged; ach. of disk

cylindric equably 10-ribbed. Recept. convex hemispherical alveolate smooth.

Not by any means abundant enough in Mad. to become a troublesome corn-weed, as sometimes in England. Indeed the preceding sp. rather more commonly takes its place.

A single pl. occurred once (July 8th 1839) in a cornfield a little below the Quinta de Lemos at S. Antonio near Funchal, which (according to my notes at the time), "with the fleshy amplexicaul merely inciso-toothed and jagged (not bipinnatipartite or finely divided) l. of *C. segetum* L., had the ray pale sulphur, with the base only of the ligules golden-y. like the disk, exactly as in the common PS. subvar. of *Pinardia coronaria* (L.)." The spec. having since been entirely destroyed by insects, I am unable to speak positively; but I incline the rather to refer it to *C. segetum* L., though I can find no record of such variation in the fl. of that sp., because in 1839, and indeed till within the last 2 or 3 years, *Pinardia coronaria* (L.) had never otherwise occurred in Madeira.

††15. Pinardia Less.

(*Chrysanthemum* Schultz in WB. 244, 248.)

††1. P. coronaria (L.). *Sejamos amigos. Pajeita*, P^to^ S^to^.

St. erect branched leafy, branches 1-3- or 4-fl.; l. somewhat fleshy bipinnatipartite broader or dilated upwards, lobes or segm. narrow-lanceolate or linear acute mucronate; fl. solitary terminal, ped. subelongate fistulose and slightly thickened upwards after fl.; ach. ribbed, resinoso-glandular-punctate between the ribs, nearly or quite as broad as long.—Koch 419; Gren. et Godr. ii. 147; RFG. xvi. t. 95. f. ii.; Willk. et Lange ii. 104. *Chrysanthemum coronarium* Linn. Sp. 1254: Desf. ii. 283; Brot. i. 379; Pers. Syn. ii. 463; Fl. Gr. ix. t. 877 (with fl. uniform golden-y.); DC. vi. 64; Schultz in WB. ii. 249; Seub. Fl. Az. 32.—Herb. ann. PS. reg. 1, 2, ccc. Cornfields and roadsides everywhere, about the town, towards the S.W., Serra de Dentro, &c.; Mad. very recently naturalized only in the Port. Cemetery, Funchal. Apr.–June.—Pl. 2–4 ft. high branched altogether erect pale subglaucescent gr., somewhat fleshy, smooth and shining, erectly branched upwards, not bushy. L. finely divided, the segm. flat but narrow, each sharply sphacelate-mucronate or shortly aristate; upper l. auriculate, lower attenuated into a stem-clasping petiole. Fl. large and handsome, 1–1½ in. in diam.; ped. erect stout ribbed or striated,

hollow and a little thickened upwards below the heads in fr. Heads umbilicate hemispherical in fr.; scales all adpressed unequal broad obtuse, the outer ovate or oval keeled fleshy pale glaucescent gr. with narrow scarious pale drab-brown edges, inner very broadly oblong or spathulate broadly scarious and undulate at top. Disk of fl. golden-y.; ligules either (as more commonly in PS.) pale straw or ochre-y. deeper or golden-y. at the base, or, as in Fl. Gr. and RFG. l. c. and mostly in Mad., uniform deep full golden-y. like the disk, about 6 lines long, 2 wide, their length equalling diam. of disk. Recept. naked in all stages, convex, in fr. subhemispherical but twice as broad as high, spongy- or pithy-solid within. Ach. chestnut brown, the spaces between the ribs concave or depressed granulato-rugulose and sprinkled with shining resinous dots; of ray largest, 2–3 millim. long and broad, subequally 3-sided, the 2 dorsal angles sharp and narrowly winged, each wing ending at top in a small tooth or denticle, inner angle broadly winged, especially upwards, where it ends in a large laterally or horizontally prominent compressed tooth or angle; back plano-convex with a single smooth broad flat rib up the middle, the sides concave with mostly 2 or 3 narrow fainter ribs, the whole surface being finely reticulato-granulate and sprinkled with resinous dots. Ach. of disk smaller more distinctly granulate and copiously resinoso-punctate, mostly nearly or quite as broad as long, much compressed 2-sided with the inner angle only sharply winged and distinctly beaked or toothed at top, the back bluntly keeled with a prominent but not winged dorsal rib and the sides each very strongly 2- or 3-ribbed. A few smaller ach. also occur occasionally less compressed and irregularly 4–5-gonal. All the ach. are abruptly truncate at top without any erect tooth or denticle and with no trace of crown or border; and their form is that of the inverted frustum of a cone, 3-sided in the ray, compressed or 2-sided in the disk.

I can find in my spec. no warrant for the application of the words "apice dilatatis" DC. or "élargis vers le sommet" Gr. et Godr. to the lobes or segments of the l. But it is true of the whole l. as originally laid down by Linnæus.

16. ARGYRANTHEMUM Webb.

(*Stigmatotheca*, *Argyranthemum* and *Ismelia* sect. ii., iii. Schultz in WB.)

1. A. PINNATIFIDUM (L. fil.). *Malmequer* or *Pampilho*.

L. 3–4 *times as long as broad elongato-lanceolate pinnatilobate, or pinnatifid,* lobes or pinnæ several (6–8) *subalternate* subequal

parallel *approximate confluent suberect* or pointing forwards, broad leafy oblong sharply inciso-serrate, the teeth pointing forwards; fl. in terminal mostly large many-fld. cymes; ped. *simple slender*; l igules w. subelongate, disk golden-y.—Varr.:—

a. flaccida; branches ascending elongate spreading, l. flaccid with acute lobes and teeth, cymes ample many-fld.—*Chrysanthemum pinnatifidum* L. fil. "Suppl. 377;" Ait.! Hort. Kew. (ed. 1) iii. 231? Pers. Syn. ii. 461; Spr. iii. 582; DC.! vi. 66; Seub. Fl. Az. 32? *Chr. lacerum* Buch (Mad. List)! 194. no. 263. *Pyrethrum grandiflorum* Holl et Reich. List (not Willd.). *Stigmatotheca pinnatifida* Schultz in WB. ii. 255 (not *Argyranthemum pinnatifidum* Webb in WB. t. 95, which according to Schultz in WB. ii. 276, is composed of 3 distinct sp.).—Shr. Mad. reg. 1, 2, 3, cc. Rocks in all the principal ravines, especially near cascades or down which water trickles, above 2000 ft.; and in the north on the sea-cliffs also. Apr.–July.—A smooth straggling or loosely branched shr. 2–5 ft. high wholly inodorous whilst fresh. Branches stiff rather brittle ascending and rising corymbosely or candelabra-like all to the same height, leafy upwards only, the old dried or withered l. persistent and pendulous below the new. L. crowded 4–5 in. long (including petiole), 1–1¼ in. broad, full bright gr. and shining, oblong-lanceolate subobtuse, gradually cuneato-attenuate downwards, not deeply (i. e. but little more than halfway down to the midrib) pinnatifid or lobed, the lobes equal close broad leafy with their edges and the tips of their sharp teeth or serratures marginato-sphacelate. Cyme terminal mostly ample and many-fld., 6–12 in. broad but sometimes, as on sea-cliffs in the north, few(2–5)-fld. Uppermost or floral l. spathulate-oblong nearly or quite entire. Fl. large conspicuous, the ray always pure w., disk golden-y., 1–2 in. in diam., rising just above the l. in terminal cymes, all of which unite into one large corymbose sheet of blossom covering the bush. Ped. slender striated subquadrangular, not thickened upwards. Heads in bud depressedly globose. Pericline in fl. hemispherical or shallow-cup-shaped, in fr. more flattened; scales imbricate very unequal, the outer shortly and broadly ovate or triangular-ovate subacute gr. fleshy-herbaceous with dark coffee-brown scarious tips and edges, the inner broadly or almost wholly membranaceo-scarious very obtuse or lacerato-spathulate, their broad dilated pale drab-brown tips spreading or reflexed, forming a lacerate membranous horizontal or recurved sort of frill or collar close beneath the ray. Disk at first flat then convex, in fr. hemispherically conic, ½–1 in. broad. Tube of all the florets smooth. Ligules 10–20 about ¾ in. long, 2 lines broad, elliptic-oblong or ligulate. Recept. in fr. either moderately i. e. hemispherically, or highly i. e. pyramidally conoidal, the base being

either as broad or a little broader than, or only half the height; always naked. Ach. of ray unequally triquetrous incurved and convex at the back, the angles winged, crowned with a dimidiate secund 4-toothed coriaceous border; of disk small abortive linear-oblong compressed winged at the ventral margin, crowned as in the ray, but gradually less distinctly inwards.

In drying mostly inodorous, yet sometimes in sea-cliff examples approaching β, exhaling a fine hay-like fragrance.

The union of all the separate cymes of each branch, whether many or few-fld., into one immense close cyme, often 3 or 4 ft. or even more in diam. and covering the whole bush, renders this pl. in fl. one of the most striking objects of the ravine or mountain flora of Mad., forming broad masses of a dazzling whiteness conspicuous from afar on rocky cliffs and precipices.

β. *succulenta*, dwarfish thickly bushy, branches crowded close short; l. stiff fleshy less distinctly lobed, the lobes and teeth more or less obtuse, cymes reduced to 1–2 or 3 fl. — *Chr. odoratum* MSS. olim.—Shr. per. Mad. reg. 1, r. P^ta^ de São Lourenço abundant on the Ilheo dos Embarcadores and I. de Fora; sea-cliffs between S. Vicente and Seixal but less typical and approaching α. March–June.—A mere depauperated maritime var., and, as such, stiffly and thickly fleshy or succulent in all its parts, with a densely leafy bushy dwarfish habit, and only 1–3 terminal fl. to each branch. A low shr. 12–18 in. high, covering the ground in dense bushy leafy masses. L. crowded 2–3 in. long (including petiole), ½–¾ in. broad, smaller or shorter and less deeply (not halfway down) or distinctly lobed or divided than in α, with the lobes shorter and more evenly or finely but obtusely toothed rather than serrate, and more or less stiffly rigid thick and fleshy. In extreme states they are more properly doubly inciso-toothed than pinnatilobate. Fl. mostly solitary or 2–3 only, rather larger or at least much coarser and thicker than in α; heads swollen hard and fleshy, on stouter stiffer ped., in fr. very turgid large and rigid with the disk hemispherical and the recept. hemispherically conoidal solid within and woody. Ligules 15–20, about 1 in. long, 3 lines broad, spreading horizontally, finally recurved or reflexed; disk ¾ in. in diam. Ach. of ray unequally triquetrous, incurved and convex at the back, the 2 side angles broadly winged, the ventral narrowly winged or simply keeled, the wings or angles produced into an auriculate or dimidiate obliquely secund irregularly toothed coriaceo-membranous crown or border: ach. of disk compressedly subquadrangular and strongly ribbed, with a single broad ventral wing only, very finely reticulato-granulate or shagreened as if

frosted all over, and spotted streaked or varied more or less with dark purple, crowned chiefly on the inner side with a dimidiate obliquely unilateral or inwardly secund 3–4-toothed crest or border formed by the production of the ventral wing, 2 principal side ribs, and dorsal keel. The inner ach. of the disk, except the three or four outer rows, are barren or abortive, and the teeth of their crown bright purple.—The extreme (P^ta de S. Lourenço) state of this looks like a distinct sp., but passes by imperceptible gradations on sea-cliffs in the north into *a*, giving out in drying a strong Melilot or hay-like fragrance.

Ismelia maderensis Don in Sweet's Brit. Fl. Gard. (ser. 2) iv. t. 342, with glaucous foliage and pale straw-coloured ligules, erroneously stated to have been introduced by Mr. Webb from Mad., and referred both by DC. l. c. and Schultz in WB. l. c. to the present pl., is evidently the Lanzarotan (Can.) *Argyranthemum ochroleucum* Webb.

Ismelia Cass., founded on *Chrysanthemum carinatum* Schousb., and to which the name properly belongs, differs from *Argyranthemum* Webb in its herbaceous habit and flat or plano-convex receptacle.

Ismelia Schultz in WB. is a compound of this pl. of Schousboe with two Canarian *Argyranthema* Webb. *Ismelia* Lesson and *Ismelia* Don differ no less widely from the original type.

2. A. HÆMATOMMA (Lowe).

L. *twice as long as broad ovate or broadly ovate-oblong pinnatisect*, pinnæ few (4–6) *opposite* subequal parallel *remote distinct spreading* broad succulent and rigid, oblong, irregularly pinnatifid or deeply and strongly or coarsely inciso-toothed, the teeth ovate or triangular acute spreading; fl. solitary or 2–3 together terminal; ped. *thickened and clavate upwards*; ligules either more or less pink or rose-colour or w., *disk atro-purpureous.*—*Chr. hæmatomma* Lowe in Hook. J. of Bot. viii. 296.—Shr. per. SD. reg. 1, 2, rrr. Sea-cliffs and rocks of the Bugio or S. D. only, here and there quite up to the top of the island. May–July.—A shr. 2–4 ft. high, resembling *A. pinnatifidum* (L. fil.) *a*, but with a less branched more straggling habit and very different foliage. Branches fewer stouter thicker and shorter, subdecumbent from the weight of the heavy fleshy foliage, or ascending, not fastigiate or corymbose, leafy only towards the ends. L. 2–3 in. long, 1–1½ broad, in outline or circumscription broadly ovate or oval, in teeth and mode of division resembling somewhat those of *Senecio incrassatus* Lowe or *S. vulgaris* L., cuneately attenuate at the base

into the petiole with 2 or 3 large spreading or recurved teeth below the pinnæ, very thick stiff and fleshy and of a rather dark full gr.; their edges and tips of the strong coarse teeth marginato-sphacelate. Fl. not corymbose but on ped. of different lengths 3 or 4 together or single at the ends of the branches covering the whole bush. Ped. stout stiff strongly ribbed distinctly thickened upwards. Heads and pericline as in *A. pinnatifidum* β, thick swollen hard and fleshy; scales large broadly oval brown scarious entire. Ligules of ray broad and rather short (½ in. or half diam. of disk long) 15–20, varying from a fine madder-pink or rose to pure w. Disk in bud y., in fl. dark dull blood-purple, conico-convex becoming more so in fr. Fl. of disk entirely smooth, their teeth dark purple. Recept. naked, in fr. highly conical hollow. Ach. of ray large incurved or boat-shaped or thickly shortly broadly and subequably triquetrous, very broad and convex or almost gibbous at the back, the 2 side angles very sharp and mostly winged, sometimes simply carinate, the ventral angle always broadly (sometimes doubly) winged, all the wings rudely sinuate or toothed and produced into a dimidiate oblique inwardly declining or secund broadish irregularly sinuate-toothed or beaked crown or crest. Ach. of next 4 or 5 rows also fertile and similar, but much compressed and more and more shortly oblong, winged both dorsally and ventrally, but not at the sides, which have only a faint rib or two: the inner numerous in many rows, all smaller and abortive, but with irregular more or less rudimentary wings and crown like the outer. All the ach. are finely shagreened or frosted as in *Arg. pinnatifidum*, but brown, much larger or coarser, and wholly different in aspect.

A bush of this sp. on its native black or grey and barren crags, one mass of lovely rose-pink fl., and conspicuous from afar like a *Camellia* or *Rose* bush, is a truly splendid and surprising sight. The fl. however are very inconstant in intensity of colour; and removed from the neighbourhood of the sea, the l. also lose their extremely rigid fleshy character.

3. A. DISSECTUM (Lowe).

L. broadly ovate-oblong or lanceolate 2–3 times as long as broad *pectinately finely and regularly subdecomposed or* 2–3-*pinnatisect*, the divisions all *linear-ligulate or narrow-lanceolate and sharply acuminate*; pinnæ numerous (10–15 or 16) alternate subequal parallel remote distinct rectilinear pointing forwards, pectinately sharply and finely pinnatisect or pinnately inciso-serrate, the lower pinnules again here and there sharply gashed or serrate-toothed, the pinnules serratures or teeth all pointing

forwards *finely pectinate acuminate*; fl. few (2–5) together, terminal, scarcely corymbose; ped. slender simple slightly thickened upwards; ligules w. rather short, disk golden-y.—*Chrysanthemum dissectum* Lowe Novit. 17 or 539. *Argyranth. pinnatifidum* Webb Icon. in WB. ii. t. 95. ff. 2?, 4. *Stigmatotheca lacera* Schultz in WB. ii. 257. *Chrysanth. Broussonetii* Pers. Syn. ii. 461 (not Balbis) fide Schultz in WB. l. c. *Chrysanth. grandiflorum* α *adauctum* (excl. habit. "Ten.," ad *Chr. Broussonetii* Balbis spectante) et γ *subnudum* (excl. habit. "Can.") DC. vi. 66 (not *Pyrethrum grandiflorum* Willd., Spr.). *Matricaria pinnatifida* β Desr. in Lam. Enc. iii. 729. *Pyrethrum Broussonetii* β *elongatum* Choisy in Buch Can. 149 (ex Sch. et DC.).—Shr. per. Mad. reg. 2, 3, r. Towards the top of high sea-cliffs and on moist rocks of the interior; top of the Cabo Giram, of Pico do Rancho, and of the cliffs at P^ta^ do Pargo; also on banks and in hedges about cottages above the church at P^ta^ do Pargo; nowhere below 1200 ft.; also high wet rocks on W. side of the Pico Grande. Apr.–July.—Shr. with the habit of *A. pinnatifidum a*, but more loosely or straggling branched 2–4 ft. high, wholly smooth and inodorous. L. 3–5 in. long, 1¼–2½ broad, finely and pectinately 2–3-pinnatisect, with all the divisions distinct straight regular, and, though fine and narrow, flat and leafy; in outline or circumscription lanceolate or ovate, cuneato-attenuate and mostly quite entire or without teeth below the lowest pinnæ, of a bright full gr. and shining. Fl. covering the whole bush, yet imperfectly corymbose on each branch, or in irregular few-fld. cymes. Ped. slender nearly all the way up, only a little thickened close below the heads, angular ribbed or striate. Heads larger and thicker than in *A. pinnatifidum* α; scales very broadly scarious, the inner almost wholly membranous pale (drab) brown. Ligules 15–20 (sometimes only 10 or 12), 6–8 lines long, 1½ broad, always pure w. Tube of fl. smooth or slightly resinoso-punctate. Disk always golden-y. convex, in fr. conical. Ach. of ray broadly or narrowly boat-shaped like those of a *Calendula*, incurved, convex at the back, unequally 3-winged, the ventral wing broadest and more or less distinctly 1-toothed in the middle, produced with the 2 side wings into a dimidiate stiff toothed crown or border, the sides and back even or faintly and irregularly ribbed, the whole quite smooth and not or almost imperceptibly reticulate or frosted, of a uniform pale straw-colour not dotted with purple. Ach. of disk: outer 1–3 rows only fertile much compressed keeled at the back, the ventral margin only winged, the sides strongly 2- or 3-ribbed, otherwise except in size like those of the ray; the numerous inner rows abortive small compressed or linear, ribbed or striated but all with some remains of a ventral wing and dimidiate crown or crest reduced sometimes to a mere inner

tooth or beak but by no means warranting the expression "Ach. disci . . . . pappo destituta *calva*!" used by Schultz l. c. Recept. naked pyramidally conic.

All the ach. are considerably smaller than in either *A. pinnatifidum* (L. fil.) or *A. hæmatomma* (Lowe).

A very distinct and fine sp., characterized at once by its pectinate finely divided foliage. In the Canary Islands I have seen nothing at all approaching it. Webb's fig. 2 (t. 95) in foliage is much more like *Arg. hæmatomma* Lowe, from a scrap of which it possibly may have been taken; but f. 4 represents very fairly a leaf of the present pl.

B. Recept. chaffy.

Tribe X. *Anthemideæ*.

(Like *Chrysanthemeæ* except the chaffy recept.)

17. ORMENUS Cass.*

(*Ormenis* and *Marcelia* Cass.; *Perideræa* Webb, *Chamomilla* Godr.)

†1. O. MIXTUS (L.). *Margaça.*

Annual scentless villous-hoary proliferously branched with scanty or small foliage; l. impunctate narrow-oblong ligulate or spathulate regularly and equably or pectinately serrato-pinnatifid 4–6 times as long as broad, the rachis broad ligulate, the pinnæ short remote distinct parallel laciniately 1–2-pinnatisect, in the upper l. entire, segm. or laciniæ short acute cuspidate; heads radiate solitary terminal; ligules y. at the base, presently reflexed; scales of inv. always close-pressed; tube of fl. produced downwards at their base on the inner side into a pointed dimidiate hood or calyptra-like spur half embracing the ach.; chaffs lanceolate acute concave carinate or narrow-boatshaped with a prominent coloured keel, pilose towards the tip; ach. greenish finely and closely striolate lengthwise.—*Ormenis mixta* DC. vi. 18; WB. ii. 288; Coss. et Germ. Fl. Par. ii. 398; Willk. et Lange Fl. Hisp. ii. 89. "*Ormenis bicolor* Cass. Dict. 36. 355" (ex DC.). *Anthemis mixta* Linn. Sp. 1260; Brot. i. 393; Pers. Syn. ii. 465; RFG. xvi. t. 110. f. 1. *Anth. hispanica* Zucc. ex DC.; Pers. Syn. ii. 466. *Anth.*

* "Ορμενος, a pl. of the Asparagus tribe, or the sprout or heart of a cabbage or of any other pl. (Hesych.); misprinted or misspelled *Ormenis* by Cassini.

coronopifolia Willd. ex DC. et Gr. et Godr.; Pers. Syn. ii. 465. *Anth. maritima lanuginosa annua, foliis crassis Pyrethri sapore, semiflosculis albis juxta discum luteis*, Michel. Gen. 32, t. 30. f. i. —Herb. ann. Mad. reg. 2, r. Cornfields waste ground and roadsides only towards the W. end of Mad.; Paul do Mar, Fajãa d'Ovelha about the Lombado, P^ta^ do Pargo abundant in fields near the church; in the road from the Paul to P^to^ Moniz at the turn down to the Rabaçal, S^r^ J. M. Moniz. May–Sept.—Root vertical long and simple. St. mostly dark purple, sometimes several branched from the root and ascending or diffuse, sometimes simple erect and branched only upwards; branches once or twice proliferously subdivided, widely forked or spreading, hard and stiff or rigid, villous and greyish-hoary like the l., each ending in a solitary fl. L. $\frac{1}{2}$–$1\frac{1}{2}$ in. long, 2–4 lines broad, mostly rather inconspicuous or scanty, the 3 or 4 uppermost pinnæ usually much longer than the rest. Heads solitary at the ends of the st. and branches, not corymbose, each rising above its predecessor and flowering later, so that there are seldom more than 2 or 3 open together on a branch or stem. Ped. slender villous-pubescent not thickened upwards. Fl. $\frac{1}{2}$–1 in. in diam., like those of *Anthemis Cotula* L. but with the w. rays or ligules y. at the base often styliferous and fertile and perhaps broader shorter and fewer; always at night and soon permanently strongly reflexed. Disk golden-y. Tube of fl. of disk 2–3-angular or winged, the inner angle produced downwards into a distinct pointed hood covering the top of the ach. Scales of inv. villous, never reflexed. Recept. in fr. conico-cylindric, hard and woody, chaffy all over. Chaffs at all times shorter than and concealed by the flts., pilose towards the tip, conduplicate downwards and embracing the ach., pale straw with the keel and tip bright chestnut. Ach. small 1 millim. long, not quite half as broad, pale dull greenish drab, oblong-obovate or clavate obcompressed, obliquely rounded and immarginate at top without any crown, rim, edge or border, smooth and naked but finely and closely striolate longitudinally, with 3 often obscure and obsolete equal obtuse ribs (1 central, 2 marginal) on the inner side. Epigynous disk small oblique or excentric.

Godron's genus *Chamomilla* differs only in extent and not in characters from *Ormenus* Cass. which it therefore cannot supersede.

2. O. AUREUS (L.). **Madeiran Chamomile.** *Macella* or *Macellinha de Botão.*

Perennial stoloniferous suffruticulose very dwarfish cespitose strong-scented villous hoary; roots or stolons woody creeping

with short erect mostly simple 1-fld. st. from the rooting nodes; l. crowded ligulate-oblong or spathulate 3–4 times as long as broad finely bipinnatipartite punctate, the divisions crowded upwards subsetaceous or narrow-linear acute; heads small rayless or discoidal globose or hemispherical solitary terminal, scales of inv. always close-pressed; fl. homogamous, the tube at base completely embracing the top of the ach. and 2-auriculate or 2–3-lobed or spurred; chaffs oblong-lanceolate concave carinate obtuse, lacerato-toothed and slightly hairy upwards; ach. (abortive) chestnut-brown trigonal smooth and even.—*O. nobilis β discoidea* Willk. et Lange ii. 89. *Anacyclus aureus* L. Mant. alt. 287; Willd. Sp. iii. 2172; Brot. i. 363; Brot. Phytogr. ii. 188, t. 163 (excl. syn. Lam.); Pers. Ench. ii. 465 (excl. var. *β*) not Lam. *Anthemis aurea* DC. vi. 7; Webb It. Hisp. 37; Seub. Fl. Azor. 32 (not Brot.), *Marcelia aurea* Cass. "Dict. 34. p. 107."—Lobel. Ic. t. 771. f. 2.—Herb. per. Mad. reg. 3, r. Open dry sunny mountain pastures. Pico da Sylva up the Caminho do Meio abundant: at the back of the Icehouse hill (Pico do Areeiro) near the Poço de Joncales (João Carlos?); about the Ponso, &c. June–Aug.—A small inconspicuous low prostrate cespitose villous-pubescent pl. with peculiarly fine delicate moss-like foliage of a somewhat grey or hoary dull gr., with a bitter aromatic scent and flavour, gregarious or forming beds or patches in the short mountain turf. Roots creeping; each thickened woody root-stock or rhizome sending out, besides its own strong roots or fibres, horizontal runners rooting at their nodes and forming new pl. St. sometimes several procumbent or ascending 2–4 in. long from each rooting node or rhizome, but mostly single simple unbranched erect 1–3 in. high 1-fld., rarely with short leafy or sometimes 1-fld. side-branches, all hard strong tough thickly hoary-villous, often red or purple. L. at most 6–8 lines long, 2 lines broad narrow-oblong or linear-spathulate in outline, the lower pinnæ short and remote, upper longer crowded and deeply cut into 2 or 3 or more segments, all the divisions extremely fine and narrow or almost capillary but flat and linear, the ultimate segm. very acute but scarcely cuspidate; the whole villous-pubescent and finely punctate. Heads golden-y. uniformly (even in cultivation) "anacyclous" or rayless, always solitary at the end of each st. or root-branch, on slender erect villous-pubescent ped. rising ½–1½ in. above the l., homogamous 3–4 lines in diam., in fl. hemispherical, in fr. shortly and obtusely conical or conico-globose. Inv. hemispherical, scales imbricate oblong obtuse broadly lacerato-scarious, clothed with silvery-villous hairs, at first gr. with brown edges, in fr. altogether grey or brown, and in all stages closely firmly and compactly adpressed. Fl. of margin tubular equably 5-cleft and perfect like the rest, with equal ovate segm. and no trace or rudiment of ligule. Tube of cor. rugose or scrobi-

culate completely embracing with its base introsusceptively the top of ach. or ov., 2–3-angled or winged, the wings or angles always produced downwards into either 2 distinct opposite auricles or 2 or 3 short lobes or spurs. Recept. in fr. narrowly and highly i. e. pyramidally or cylindrically elongato-conic, twice as high as broad, solid within, chaffy all over; chaffs as long as tube of fl. concave and embracing the fl. or ach., oblong-lanceolate obtuse and irregularly toothed or sublacerato-serrate upwards, very pale opake straw-colour with broad thin silvery-membranous hyaline colourless margins, sprinkled upwards with a few w. scattered hairs. Ach. all abortive in my numerous Mad. and Portuguese specimens, very small uniform dark chestnut-brown, altogether smooth or naked, cuneate with straight not bulging sides, subcompressed distinctly trigonal i. e. with the back flat and even and the inner face strongly 3-ribbed with the middle keel sharper or more prominent than the 2 lateral. Occasionally but rarely a 4th rib is developed on the back, making the ach. appear subtetrahedral instead of trigonal. Top of ach. completely inserted into the spurred or lobed base of the persistent cor. as into a socket. Crown or border 0.

Adheres slightly to the paper chiefly by the heads in drying.

A much smaller pl. with far more delicate moss-like hoary (not full-gr.) foliage and suffrutescent dry hard (not at all succulent) st. than the common English Chamomile or *Ormenus nobilis* (L.)=*Anthemis nobilis* L., EB. t. 980, DC. vi. 6=*Chamomilla nobilis* Gren. et Godr. ii. 150; differing further not only in the mostly simple short erect 1-fld. st. and smaller constantly rayless or discoidal heads of fl. and (in outline) narrow spathulate or ligulate l. (not short ovate or ovate-oblong or less than twice as long as broad as in EB. t. 980) but also in having the tube of cor. always spurred or lobed at the base (not "non appendiculé" Gr. et G.), with the (abortive) ach. uniform dark chestnut (not "verdâtres" or "munis de 3 côtes *blanches* sur la face interne") and in shape simply cuneate-trigonal with *straight* sides (not "obovés-en-coin"). It is also clear, by careful comparison with Portuguese spec. from the Barão do Castello de Paiva and with the Lisbon "Macella" of the shops in Funchal, that botanically the Mad. pl. is precisely identical with the Portuguese or *Anacyclus aureus* of Brotero. The Lisbon "Macella" has however a sweet honey-like fragrance instead of the peculiar bitter aroma of the Mad. pl., which, Sn^r^ Mauricio de Machado informs me, possesses also

in a much greater degree the peculiar bitter chamomile principle, and is more efficacious than the Lisbon sort.

De Candolle refers *Anthemis nobilis β flosculosa* Pers. ii. 466 to the present pl.; for which he had perhaps some special ground. Otherwise it would seem rather to belong to the rayless state (*β discoidea* Gay) of *Ormenus nobilis* (L.) to which Persoon refers it, since he otherwise must be supposed to have recorded the same pl. twice over in two successive pages—first as *Anacyclus aureus* L. and afterwards under *Anthemis nobilis* L.

In the rayless var. *β discoidea* Gay in Bourg. Pl. Hisp. Exs. 1849, no. 281 &c., of *O. nobilis* (L.), the heads vary from 4–7 lines (being never less than 4 and mostly 5 or 6) in diam. without the ray. In *O. aureus* (L.) they never exceed 4 lines in diam.

Brotero's fig. in Phyt. Lusit. t. 163 of the present pl. is extremely bad, as already remarked by Webb; but his description leaves no doubt about the pl. intended.

Of pl. allied to *O. aureus* (L.) by name or affinity, *Anthemis aurea* Brot. Fl. Lusit. i. 394 is referred by DC. doubtfully to *O. nobilis* (L.). It may prove however to be rather a radiate state of *O. aureus* (L.), as the locality and remark of Brotero "deme radium corollæ, habebis *Anacycl. aureum*" seem to suggest, though I have never met with such a state.

Anacyclus aureus Lam. Dict. i. 141, Ill. t. 700. f. 2 is *Cotula aurea* L., a very different pl.

†18. ANTHEMIS L.

(*Anthemis, Chamæmelum, Maruta* Cass.)

†1. A. COTULA L. *Margaça.*

Scented, mostly smoothish or glabrescent, gr. not hoary, corymbosely branched upwards; l. impunctate tufted or crowded down the st. feathery or finely multifid 2–3-pinnatipartite, in outline ovate-oblong or oval, not more than twice as long as broad, the divisions all fine and narrow-lanceolate or linear acute equal in breadth, close or crowded and tufted; heads radiate terminal loosely subcorymbose; fl. of ray mostly neuter; recept. chaffy all over, sometimes only upwards towards the centre; chaffs linear-setaceous with subulate points smooth caducous; ach. coarsely 10-ribbed tuberculate clavate subquadr-

angular upwards truncate and flat or plano-convex at top immarginate, the edge obtuse strongly 10-crenate but naked without rim or border.—Linn. Sp. 1261; Brot. i. 393; Pers. ii. 466; EB. t. 1772; Sm. E. Fl. iii. 458; Buch 195. no. 267; Koch 414; Seub. Fl. Az. 32; Bab. 174; RFG. xvi. t. 109. f. i.; Willk. et Lange Fl. Hisp. ii. 88. *Maruta Cotula* Cass., DC. vi. 13; WB. ii. 284.—Herb. ann. Mad., PS. reg. 1, 2, c. Cornfields, waste ground and roadsides chiefly in the N., but also on P^ta^ de S. Lourenço (Ilheo dos Embarcadores), at Camera de Lobos on the Fort-hill above the church, Prazeres &c.; in the N. at P^to^ Moniz, S. Vicente, S. Jorge towards the P^ta^ do Ferrovo, &c.; in PS. about the town, Serra de Fora, &c. general. Apr.–Sept.—St. either several from the crown ascending or diffuse, or single stiffly erect straight simple and divaricately branched only upwards, 6–12 or 18 in. long, hard ribbed or angular, thickly leafy downwards. L. full gr. mostly smoothish in Mad., in PS. more or less glandular-pubescent but never villous-hoary, 1–2 in. long, $\frac{1}{2}$–1 in. wide, crowded or tufted on the st., finely divided and compound like those of the true Chamomile, *Ormenus nobilis* (L.), the segm. very finely narrow-linear, but flat cuspidate crowded spreading, with a not unpleasant scent like Chamomile but less strong. Fl. $\frac{3}{4}$–1 in. in diam. solitary on long slender ped. at the ends of the branches, several or many opening together and forming a loosely irregular cyme; disk golden-y., ligules altogether w. 3–4 lines long, 1–2 wide, at night and presently altogether deflexed, always without styles and barren in Mad.; "rarely fertile" Gr. et Godr. Disk in fl. hemispherical, in fr. obtusely conic, bristly upwards with the subulate or setaceous tips of the chaffs rising and appearing above the yet unopened florets. Ped. slender not thickened upwards pubescent with short w. cottony down or hairs like the subequal oblong obtuse broadly scarious green-nerved scales of the pale gr. plano-hemispherical inv. Tube of fl. mostly 2-winged or angular and globosely dilated or bulbous at the base, but never either embracing the top of ach. or produced downwards into lobes or spurs. Ach. pale sandy-brown turbinate or clavate, sometimes subquadrangular upwards, coarsely 10-ribbed and tuberculate, smooth and naked but with resinous dots or glands, the top slightly convex or flat with a small raised central epigynous disk, the edge strongly 10-crenate obtuse, without trace of crown or border. Recept. in fr. conico-cylindric nearly twice as high as broad; chaffs altogether smooth finely narrow-linear with subulate setaceous tips nearly or quite as long as the open florets, longer than the same in bud and giving the centre of the disk before its fl. open a bristly appearance. Hence perhaps the chaffs have sometimes been described as confined to the upper or central part of the recept., whereas in Mad. they are equally distributed over the whole.

DC. l. c. well observes of this pl. "variat erecta aut diffusa, glabra aut pubera, subsimplex aut valde ramosa, capitulis minoribus aut majoribus &c." It is an altogether useless but not troublesome weed in Mad.

The mostly neutral fl. of the ray and occasional absence of chaffs towards the base of the recept. are too variable or inconstant characters to warrant the retention of *Maruta* Cass. as distinct from *Anthemis* L.

A. arvensis L., RFG. xvi. t. 113. ff. i. ii., is mentioned by Schultz in WB. ii. 285 as having been also gathered by Webb in Mad.; but it has entirely escaped my constant search and the notice of all other botanists. It is distinguished mainly by its always fertile ray, its broader lanceolate or elliptic chaffs, and ach. not tuberculated but crowned with a sharp or tumid plicate rim or border. It is also a coarser stronger-growing more or less silky-downy greyish pl. with the segm. of l. shorter and broader, and the fl. larger.

The common European weed *Matricaria Chamomilla* L., RFG. xvi. t. 106. f. i., much resembling *Anth. Cotula* L. in habit, fl. and foliage, but at once distinguishable by its naked chaffless recept. and always styliferous fertile ray, has not occurred either in Mad. or the Canaries.

††19. ACHILLEA L.

§ 1. *Millefolium* Tourn. Inv. ovoidal; ligules of ray shorter than inv.

††1. A. MILLEFOLIUM L. **Yarrow.** *Feiteirinha.*

Root-stock shortly creeping stoloniferous; l. finely multifid 2–3-pinnatisect narrow-ligulate or linear-oblong in outline, rachis narrow scarcely or not winged entire, pinnæ 20–25 on each side, approximate crowded squarrosely erecto-intricate above the plane of rachis, nearly equal from the base to tip of l., the lower pinnæ in the middle stem-l. loosely and decussately stem-clasping but not elongated or longer than the rest, segm. all linear falcate finely cuspidate intercrossingly erect or incurved and ascending; heads rather large and numerous in a close crowded terminal cyme; fl. w. or roseate 4- or 5-rayed, the rays half the length of inv.; ach. truncate at top.—Linn. Sp. 1267; Lam. Dict. i. 29; Brot. i. 397; Pers. ii. 469; EB. t. 758; Sm. E. Fl. iii. 462; DC. vi. 24; Koch 410; Coss. et Germ. ii. 397; Gren. et Godr. ii. 162; Bab. 176; RFG. xvi.

t. 135; Willk. et Lange Fl. Hisp. ii. 77.—Herb. per. Mad. reg. 2, rr. Chiefly in or about gardens, to which indeed formerly (i. e. 30 or 40 years ago, at the Mount, S^{ta} Anna, &c.) it was quite confined, but has now become perfectly naturalized by roadsides or in waste ground at S^{ta} Anna, Camacha, Fajãa d'Ovelha, &c. May–Sept.—Rhizome strong tough blackish emitting long stringy simple roots and a few slender w. or purplish subterranean stolons. Whole pl. pubescent but with dark full-gr. foliage. St. stout hard robust simple straight erect branched only at top into a fastigiate cyme, 1–2 ft. high (mostly 15–20 in.) angular or ribbed somewhat thinly cottony-pubescent. L. slightly hairy-pubescent, the lower stalked and 4 or 5 in. long, the upper sessile 1–2 or 3 in. long, all 3–6 or 8 lines wide and dark full gr. with the rachis either simple or very narrowly margined and perfectly entire; segments of pinnæ numerous finely cuspidate or linear-acuminate entire all intercrossing and falcately incurved or ascending above the plane of the rachis. Cyme single terminal 3–6 in. in diam. densely many-fld., its branches and the inv. slightly cottony-pubescent. Heads oblong-ovoidal 3 lines long, 2 broad; inv. 2 lines–$\frac{2}{10}$ in. long, scales lanceolate gr. with a darker gr. nerve and brown scarious edges, altogether but thinly cottony-hairy. Ligules half the length of the inv. as broad as long i. e. $\frac{1}{10}$ in., always (in Mad.) w.; florets of disk prominent convex, their tube compressed 2-carinate, its base embracing introsusceptively the top of the ach.; the latter (immature or abortive in my Mad. spec., but in English) are narrowly oblong-cuneate obcompressed and marginate or slightly 2-winged, truncate and naked at top, smooth and even.

Introduced from England 40 or 50 years ago, this pl. has become now not only general in cottage gardens but seminaturalized in their vicinity and is a favourite rustic remedy in xaropes (drinks or decoctions), fomentations, &c.

†††2. A. Ageratum L. *Macella.*

Root-stock woody; st.-l. fasciculate shortly petioled spathulate-oblong obtuse undivided finely and regularly duplicato-serrate, the lower l. inciso-serrate or pectinately subpinnatifid downwards and attenuate at base into long petioles; heads crowded in a dense terminal cyme, fl. altogether y., ray very short; ach. rounded at top.—Linn. Sp. 1264; Vill. Dauph. iii. 256; Brot. i. 397; Pers. ii. 467; Buch 195. no. 268; DC. vi. 27; Gr. et Godr. ii. 165; RFG. xvi. t. 122. f. 1; Willk. et Lange Fl. Hisp. ii. 79.—Herb. per. Mad. reg. 2, $\frac{c}{2}$. Only in cottage gardens chiefly to the westward, Magdalena, Calheta, Fajãa d'Ovelha, &c. May–Sept.—Though recorded by Von

Buch, scarcely entitled to a place in the Mad. Flora, being merely grown in cottage gardens as a common rustic remedy for its aromatic properties, and showing no tendency, like the preceding sp., to become naturalized. St. erect hard stiff straight simple 1–2 ft. high. Whole pl. more or less very closely and shortly pubescent, strongly aromatic. L. pale dull bluish-gr. not glaucous, punctate, sharply and finely doubly-serrate, the lower more deeply incised downwards or pectinately subpinnatifid. Cyme small crowded terminal about 2 in. broad. Heads small 2 lines long, 1 broad, scales light gr. pubescent. Fl. deep golden-y., ligules small and short about 4 or 5, irregular in shape size and number, often broader than long, obtusely 2–3-lobed, coloured like the disk.

†Tribe XI. *Bidenteæ* Less.

†20. KERNERIA Mnch.

†1. K. PILOSA (L.). *Malpica. Amores de Burro.*

Glabrescent; st. erect subquadrangular; l. stalked ternately or quinately pinnatipartite, lfts. distinct rhomboidally ovate or lanceolate coarsely inciso-serrate, petioles subciliate towards the base; heads stalked subcorymbose rayed or discoidal; inner scales of inv. oblong equal, outer linear-subspathulate acute; ach. 2–3-awned.—*Bidens pilosa* Lour. Fl. Coch. ii. 488; Schultz in WB. ii. 242; J. A. Schm. Fl. Verd. 197.—Varr.:—

a. radiata Sch. l. c.; J. A. Schm. l. c.; heads radiate, ach. setulose upwards—*Coreopsis leucantha* Linn. Sp. 1282; Buch 195. no. 270. *Bidens leucantha* Willd., Pers. ii. 394; DC.! v. 598; Seub. Fl. Az. 32.

β. discoidea Sch., J. A. Schm. l. c.; heads discoidal or rayless, ach. naked.—*Bidens pilosa* Linn. Sp. 1166; Willd., Pers. ii. 394; DC. v. 597; Dill. Elth. i. t. 43.—A mere state or even only stage of *a.*

Herb. ann. Mad. reg. 1, 2, 3. ccc. In cult. ground, gardens, vineyards, by roadsides, &c. everywhere, a troublesome and universal weed. At all seasons.—Pl. 6–18 in. high with shining somewhat lurid dark gr. foliage branched and bushy. Branches square dull purplish subpuberulous glabrescent. Lfts. stalked glabrescent, 1–2 in. long, about half as broad, variable in shape, sometimes ovate or ovate-oblong. Fl. on solitary moderately long axillary ped. towards the ends of the branches about 4 lines in diam., as often rayed as rayless. Ray when present w. of 1–5 short broad ligules; disk convex y. Heads whilst immature after fl. oblongo-pyramidate, with the gr. leafy tips of the scales of inv. reflexo-patent, and the base obconical gr. and fleshy; the scales in the ripe fr. strongly reflexed dried up and in-

conspicuous. Ach. spreading and deflexed forming a globosely stellate head when ripe, dark coffee-brown or blackish, finely shagreened and strongly ribbed, obcompressedly subquadrangular, 4 or 5 lines long, scarcely 1 millim. broad, crowned at top with 2 opposite or often 3 short erect or spreading stiff sharp hornlike bristles barbed or beset with fine keen hyaline aciculate deflexed setules, and thus adhering strongly to and penetrating the clothes, rendering the pl. extremely troublesome. Receptacle clothed with caducous oblong chaffs, globoso-pulvinate or pyramidal.

It is remarkable that this most universal and abundant Mad. weed has not occurred in either Porto S^to^ or the Desertas.

It is also strange that the nearly allied and very similar tropical common weed, *K. bipinnata* (L.) RFG. xvi. t. 51. f. ii., which is not less general in the Cape Verdes than *K. pilosa* (L.), and which has even made its appearance in the South of Germany and France (Koch 396; Gr. et Godr. ii. 169), has not yet found its way into either the Canaries or Mad.

†Tribe XII. *Eclipteæ.*

†21. Eclipta L.

†1. E. erecta L.

St. erect or ascending sparingly branched and with the l. adpressedly strigose, the young shoots hirsute hoary; l. elliptic-lanceolate acuminate at each end, sessile repandly and irregularly subserrate; ped. 1–3 or 4 from the upper axils, $\frac{1}{2}$–$\frac{2}{3}$ length of l. or 2–7 or 8 times the length of the heads.—Linn. "Mant. 286;" Lour. Fl. Coch. ii. 505; Pers. ii. 470; Spr. Syst. iii. 602; DC. v. 490. *Verbesina alba* Linn. Sp. 1272. *Cotula alba* Linn. Syst. (ed. 12) ii. 564; Pluken.! Alm. t. 109. f. 1; ejusd. herb. in Herb. Sloane, vol. 101. fol. 188 in BH.; Dill. Elth. i. p. 138, t. 113. f. 137.—Herb. ann. Mad. reg. 1, r. In wet ditches and Levadas occasionally in and about Funchal; ditch at the back of the beach to the west of the Fortaleza, Levada de S^ta^ Luzia, &c. Sept.–Dec.—Whole pl. adpressedly hispidulous with short w. or grey strigose hairs. St. 12–18 in. high diffusely erect shortly and sparingly branched, round below, squarish and subsucculent upwards, purplish-brown, grey and hirsute towards the ends while young. L. rather dull gr. opposite sessile acuminate irregularly repand-serrulate $1\frac{1}{2}$–3 in. long, $\frac{1}{2}$–1 in. broad, sometimes nearly entire. Ped. slender or filiform adpressedly strigoso-hirsute, 1–3 or sometimes more together, very unequal in length but mostly $\frac{1}{2}$–$1\frac{1}{2}$ in. long. Heads

inconspicuous, without apparent ray, hemispherical, 3–4 or 5 lines in diam.; fl. dull w.; ligules short and narrow but very numerous and crowded. Scales gr. leafy broadly ovate or oval acute strigose. Ach. of disk pale sandy-brown oblong subclavate obcompressed subtetragonal or 4-ribbed irregularly rugulose or corrugate, black at top, smooth and naked, without crown or pappus; of ray triquetrous and even but otherwise similar. Epigynous disk rather prominent or mamillate umbilicate, surrounded with a slightly raised and waved subquadrangular very narrow black outer rim or border, the space between the central mamilla and outer border black and clothed with a few w. strigose hairs.

I have never consciously met with the true *E. prostrata* L. in Mad.—a pl. of altogether smaller size with much branched prostrate st., small ovate l. and very shortly stalked or nearly sessile heads (Pluk.! Alm. t. 118. f. 5 and herb. in Herb. Sloane, vol. 94. fol. 175 in BH.; Dill. Elth. l. c. t. 113. f. 138). But a Mad. spec. sent by me to the late Chev. de Candolle as *E. erecta* L. was referred by him (Prodr. v. 490, as previously in his letters) to *E. prostrata*. Hence I have possibly in Mad. overlooked the latter pl., which, however, after all, is perhaps merely a depauperated state or var. of *E. erecta* L.

§ 2. *Anthers caudate or awned at the base.*

A. Recept. scaly or chaffy all over.

Tribe XIII. *Buphthalmeæ* Less.

22. ASTERISCUS Mnch.

(*Nauplius* Cass., *Odontospermum* Neck., Schultz in WB.)

1. A. AQUATICUS (L.).

Herb. ann.; st. proliferously 1–3-branched close beneath each fl., branches very stiff wide-spreading or divaricate; l. oblong obtuse subspathulate entire, the lower attenuately stalked, upper ligulate sessile semiamplexicaul arcuately reflexed; heads many-leaved at their base, l. of outer involucral scales linear-lanceolate not cuspidate, inner scales oval obtuse without or rarely with a leaf at top; tube of cor. and ach. of ray not winged. —DC. v. 486; Koch 391; Gr. et Godr. ii. 172; RFG. xvi. t. 48. f. ii.; Willk. et Lange Fl. Hisp. ii. 47. *Buphthalmum aquaticum* Linn. Sp. 1274; Desf. ii. 290; Brot. i. 396; Pers. Syn. ii. 474; Buch 195. no. 269; Fl. Gr. ix. t. 899. *Odontospermum*

aquaticum Schultz in WB. ii. 233.—Herb. ann. PS. reg. 1, r; ND. r; GD. reg. 2, ccc. Dry sunny beds of streams or dried-up muddy places where water has collected during heavy rains; in PS. in sandy cornfields at the back of the beach sparingly; in GD. abundant all up the central valley. Apr.–June.—Whole pl. villous or pubescent bushy and leafy 2 or 3–12 in. high, of a peculiar pale apple-gr. and singular aspect from its repeatedly proliferous mode of inflorescence, viz. that to which the old botanists quaintly applied the term of "*herba impia*"—the younger fl. rising above the elder. Root simple perpendicular. St. erect straight simple and like the branches shaggy-villous hard stiff very tough and rigid pale or whitish straw-colour, with at first a single terminal fl. and then in luxuriant spec. 2–4 times proliferously branched. Branches short and like the main st., springing mostly dichotomously close beneath the fl., each bearing a terminal fl. and again divided or dichotomously branched close below it in a forked proliferous manner. L. shortly and closely pustuloso-pubescent, 1–2 in. long, crowded beneath the fl., irregularly waved or curled and subconduplicate, the upper narrower, all subobtuse. Fl. rather large sessile in the forks of the branches bright lemon-y. handsome and fragrant like Heliotrope, with, however, somewhat of a rhubarb-like smell. Heads villous hemispherical quite sessile 4–8 lines in diam. very hard or woody. Outer scales of inv. oblong produced into spreading or erecto-patent gr. wavy soft-pointed not spinose-cuspidate l., their base like the inner scales oblong pale w. or whitish hard dry coriaceous or parchment-like and woolly or cottony-villous. Ligules of ray numerous short and narrow. Disk flat.

I still possess spec. of this pl. gathered in Porto S^{to} with my late friend Webb in May 1828, ticketed by him "*Buphthalmum odorum*? Schousb., fields P^{to} S^{to}," which thus demonstrate the mistake in WB. ii. 239, line 4 from the bottom, asserting *B. odorum* Schousb. to be a Porto-Santan pl.; for most certainly Webb gathered there no other sp. but the present.

B. Recept. naked or scaly only at the margin.

Tribe XIV. *Inuleæ* Cass.

23. Inula L.

1. I. viscosa (L.). *Alfavaca* or *Alfabaca.*

Herbaceo-suffrutescent, woody downwards, subviscously villous upwards; l. lanceolate acute, sphacelately cuspidate and

subdenticulate, subcordately semiamplexicaul, heads in terminal erect somewhat leafy compound thyrsiform often few-fld. rac.; scales of inv. all simple and scarious; ligules conspicuously longer than the scales.—Ait. Hort. Kew. (ed. 1) iii. 223; Desf. ii. 274; Brot. Phyt. Lusit. ii. 190, t. 164; Pers. ii. 452; DC. v. 470; WB. ii. 220; Willk. et Lange Fl. Hisp. ii. 42. *Erigeron viscosum* Linn. Sp. 1209; Jacq. Hort. Vindob. i. t. 165; Vill. Dauph. iii. 240; Poir. in Lam. Dict. viii. 479. *Solidago viscosa* "Lam. Fl. Fr. ii. 144;" Brot. Fl. i. 381. *Pulicaria viscosa* Koch 395. *Cupularia viscosa* Gr. et Godr. ii. 181; RFG. xvi. t. 44. f. ii.—Suffrutesc. per. Mad. reg. 1, rrr.—Waste rough broken ground or rocky banks under the sea-cliffs between P^ta^ do Sol and Rib. Brava along the lower or coast road, especially about the Lugar Debaixo and between it and Tabúa, abundantly. July–Nov.—A low erect sparingly branched leafy bush 1–2 ft. high, of a pale bright gr., altogether pilose, more or less viscous, and sometimes staining the fingers brown with its clammy glandular villosity of l. and st., with a strong and not unpleasant resinous-balsamic fragrance. Branches virgate erect stiff woody and glabrescent downwards, villous and almost shaggy upwards. L. rather harsh and stiff to the touch, 2–4 in. long, ½–1 broad, lanceolate or ligulate-lanceolate, irregularly sphacelato-serrulate, very acute, slightly cordate at the base, more or less villous. Fl. in terminal long leafy pyramidal or thyrsiform erect not crowded rac. compound downwards, like those of a Michaelmas Daisy in size and habit, but bright golden-y. Heads viscous hemispherical moderately large 3–4 lines in diam. Ped. slender furnished with several small linear scattered bracts. Scales of inv. loosely erecto-patent linear-lanceolate acute or obtuse imbricate very unequal in length, glandular-pubescent, none of them foliaceous, the outer with scarious edges, inner altogether scarious except a gr. midrib, subciliate-serrulate upwards, and, when obtuse, bearded or ciliate at top. Ligules conspicuous but short, narrow linear, 2 lines long. Ach. 1½ mill. long, ⅓ mill. broad, oblong cylindric, obtuse at bottom, truncate and flat at top, even or ribless, but thickly clothed with short erect silky pubescence, pale straw-colour. Pappus always in Mad. and the Canaries a single row of fulvous or rufescent hairs 3 or 4 times the length of ach., minutely rough or ciliate, stiffish and very fragile or caducous as if jointed at the base, without any trace of an outer cup or ring, though the top of the ach. expands into a sort of brown collar, from the inner edge of which proceed the hairs of the pappus.

The ach. are ribless as in *Cupularia* Godr., but the pappus is truly simple in a single row, as in *Inula*, and without any outer crenulate short ring, cup or coronet of chaffy scales; which

also my friend Mr. Newbould has occasionally found to be the case in *Pulicaria dysenterica* (L.). Hence there remains no constant char. to distinguish *Cupularia* from *Inula* but the ribless or unstriated ach.

This pl. was first observed in Mad. by the late Dr. Lippold in Sept. 1838. It is quite confined to a narrow belt along the south sea-coast, of not more than $1\frac{1}{2}$–2 miles in length, and yet apparently is perfectly indigenous. In the Canaries, and especially in Tenerife, where it is called *Altavaca*, it is one of the commonest and most universal plants.

Tribe XV. *Gnaphalieæ* Less.

The Everlasting-flower Tribe.

24. Helichrysum DC.

The Everlastings.

Sect. 1. *Carpantha* Lowe (*Clavellata* DC.). Heads obconic or turbinate compact berry-like; scales numerous regularly imbricate erect and always compactly close-pressed never lax or radiant, yellowish-gr. or golden-brown. Pappus subcompresso-clavellate i. e. compressedly penicillate or bearded towards the tip.—Low stiffly proliferously branched shr. with w. or grey cottony l. and branches. Fl. in dense terminal cymes.

1. H. obconicum DC. *Murrão* or *Morrão*.

Snowy tomentose except the heads; l. shortly and broadly obovato-lanceolate or elliptic subacute or subobtuse attenuate downwards $2\frac{1}{4}$–$2\frac{1}{2}$ times as long as broad (including the petiole) thickly and closely cottony or velvety-tomentose subcoriaceous obscurely 3-nerved very entire; cyme 15–25-fld. small simple dense compact crowded terminal scarcely rising above the l. hemispherical or convex; heads rather large and at least as long as broad, very shortly and stoutly stalked or subsessile on the short stout divaricate snowy-tomentose branches, naked smooth and shining, at first yellowish gr. then golden-brown; ped. very short imbricate scaly upwards at the base of the heads; scales membranous at the tip and edges, very numerous, gradually larger upwards and compactly imbricate, obtuse, entire, the lower very small and running down the ped., the upper gradually larger, the inner uppermost more or less acute.—DC. ! vi. 181; Lowe Novit. p. 16 or 538. *Gnaphalium crassifolium* Buch ! 194. no. 255; Lowe in Hook. J. of

Bot. i. 35 (not Linn., or Lam., or Willd.). *Gn. tomentosum* Bowd. Exc. in Mad. p. 63 (not Hoffm.). *Antennaria leucophylla* Reichb. in Höll's List in Hook. J. of Bot. (2nd ser.) i. 19. —Shr. per. Mad. reg. l. cc. Bare and rugged sea-rocks and cliffs everywhere all round the coast of Mad., but not found in either PS. or the Desertas. The Loo Rock (Ilheo) at Funchal is almost clothed with it. It prefers the hardest and blackest basalt entirely devoid of other vegetation, springing out of crevices or fissures and contrasting conspicuously by its whiteness with its native rocks. It is never found away from the immediate vicinity of the sea. At most seasons, but chiefly June–Nov.—A low thickly bushy proliferously branched shr. 1–2 ft. high with stout erect greyish or almost snow-w. tomentose corymbose branches naked below, thickly leafy upwards, and though stiff hard and woody somewhat fragile. L. attenuately stalked crowded $1\frac{1}{4}$–$1\frac{3}{4}$ in. long (including the petiole), about $\frac{1}{2}$ in. broad, very entire subacute or often a little obtuse, of a firm soft thickish leathery substance and covered on both sides with a close short dense snow-w. tomentum. Cyme single and simple terminal subsessile or only a little overtopping the l., 1–2 in. in diam., the divisions and ped. very short stout w. tomentose without l. or bractlets, the whole in fl. dull-y. Fl. like the whole pl. slightly odoriferous. Heads 3–4 lines long, $2\frac{1}{2}$–3 broad, shortly turbinate and slightly ventricose somewhat like the fr. of a *Medinella*, shining golden-brown or greenish; the lower scales continued down the ped., regularly imbricate and gradually becoming larger upwards. Florets smooth hoary or whitish in the bud, then dull y., all 5-cleft and fertile, the 2 outer rows female very slender or filiform, the rest all perfect and altogether much larger. Recept. convex. Pappus in all the fl. rather longer than the fl., smooth downwards or very shortly and minutely puberulous or rough; bearded or fringed towards the tip with longer hairs. Ach. subturbinately oblong dark chestnut-brown angular and striolate minutely puberulous or rough with glittering erect points.

Judging from the description and from a single head of *H. hemisphæricum* DC. (Prodr. vi. 181) most kindly communicated by Prof. Alphonse De Candolle from his father's original spec., I strongly suspect that it will prove to be not really distinct from *H. obconicum*, in which the l. have very frequently only the middle nerve discernible (the shape also varying from subacute to subobtuse) and the heads become not unfrequently more rounded at the base or hemispherical as they advance after flowering. The original head of *H. hemisphæricum* before me is indeed rather obconical than hemispherical, and in its colour, its short

tomentose ped., in the shape, size, substance, colour and arrangement of the scales, and indeed in everything, agrees precisely with the heads of *H. obconicum* DC.

The supposed "Cape of Good Hope?" habitat of *H. hemisphæricum* DC. was not at all an unusual one loosely attributed by horticulturists formerly to pl. really belonging to Mad. and sent thence originally probably by Masson.

Sect. 2. *Achyrantha* Lowe (*Virginea* DC. partly). Heads hemispherical; scales erect but lax and finally spreading or subradiant brown or w. often tinged with crimson or purple. Pappus simple equally rough or pubescent throughout, not clavellate or bearded upwards.—Shr. subproliferously branched with w. or grey cottony l. and branches. Fl. in terminal cymes.

2. H. Monizii Lowe.

Snowy-tomentose except the heads; l. lanceolate or elongato-lanceolate acute or attenuate at both ends 4–5 times as long as broad (including the petiole) somewhat thickly and closely cottony-tomentose obscurely 3-nerved very entire; cyme rather large and somewhat lax or spreading 20–30 or 40-fld. terminal rising a little above the l. slenderly branched often compound; heads rather small hemispherical broader than long, freely and distinctly stalked on snowy tomentose ped. longer than themselves, smooth shining purplish-brown; scales membranous at the tip not numerous subequal lax finally erecto-patent ligulate or linear-oblong acute, the lower ovate obtuse, all pale drab-brown or greenish-brown edged with purple or crimson except their scarious pale tips.—Shr. per. Mad. reg. 1, rr. Rocky sides of ravines near the sea and sea-cliffs; Rib. da Praia Formosa, W. of Funchal, above the bridge; Pico do Rancho and thence all the way to Campanario profusely; Brazen Head sparingly; first observed and distinguished by S^r J. M. Moniz 1858. Nov.–Febr.—A low shr. with quite the general aspect and w. or snowy cottony foliage of *H. obconicum* DC., so that when not in fl. it has been often probably overlooked as a mere luxuriant state of it, this species is a larger more loosely less regularly proliferously branched pl. 2 or 3 ft. high, with longer looser somewhat flaunting or declining less stout and stiffly erect branches. L. very different in shape and less stiff or coriaceous in substance. Fl. scentless. Cymes larger more loosely or freely branched and compound, with the heads much smaller squarrosely or loosely scaly and of a fine warm purplish light brown, all distinctly stalked, 2 lines long and broad, the scales loosely or squarrosely erecto-patent

green at first in the middle, then chestnut-brown edged with purple, and with pale colourless membranous plicate or denticulate tips and borders. Florets all 5-cleft fertile, the female in 2 or 3 rows. Pappus simply rough or scabrous throughout with short equal pubescence, not clavate, not longer than the fl. Recept. slightly convex papulose. Ach. chestnut-brown elliptic-oblong sprinkled with erect glittering points.

3. H. MELANOPHTHALMUM (Lowe). *Propéta* i. e. *Perpetua.*

Grey-w. tomentose except the heads; l. elongato-lanceolate attenuate at both ends 3½–4 times as long as broad (including the petiole) closely but not thickly cottony-tomentose 1-nerved very entire; cyme large terminal compound many-fld. (50–100) loosely or distinctly branched but mostly subglobose or hemispherical dense compact and crowded; heads rather large hemispherical broader than long freely and distinctly stalked smooth, not shining, dead snow-w. or rarely partly purplish or crimson, the disk atropurpureous in fl., dark brown or black before and after; scales regularly imbricate lax squarrose finally subradiant, altogether and permanently opake snow-w. and scarious without pale tips or edges, the lower and middle broadly ovate mostly obtuse entire, the innermost oblong acute or undulato-plicate and sublacerately toothed.—DC. ! vi. 177; Lowe in Hook. J. of Bot. i. 35. *Gnaphalium melanophthalmum* Lowe Prim. 29. *Elichrysum melaleucum* Reichb. in Höll's List in Hook. J. of Bot. i. 19. *Gnaphalium rupestre* Sol. ! MS. in BH.; Buch ! 194. no. 254 (not Rafin.).—Shr. per. Mad. reg. 1, 2, 3, 4, c; PS. reg. 1, 4, r/2; GD. reg. 1, rr or r/2. Sea cliffs, rocky sides of all the principal ravines and craggy summits everywhere in Mad. but principally in the North where it fills the whole air along the sea-cliffs with its honey-like perfume when the sun shines hot. In PS. and GD. confined to the sea cliffs and highest inland peaks. Apr.–Aug.—Habit like the last, but with much more thinly tomentose and less decidedly snow-w. foliage. A fine and handsome low shr. corymbosely branched 2 or 3 ft. high. Flowering branches corymbose loosely ascending snow-w. cottony, thickly leafy downwards and clothed at the base with the withered l. of the preceding year. L. 1–2 in. long, 3–4 lines broad much attenuated into the petiole, shortly and closely but less thickly tomentose than in *H. Monizii* and grey rather than snow-w. Cymes large terminal lax or spreading many-fld. rising quite above the l., each composed of numerous smaller cymes, somewhat loosely branched, branches and ped. distinct snow-w. tomentose. Fl. odoriferous like honey. Heads snow-w. quite smooth not shining, globose in bud, then hemispherical, finally subradiant, 3–4 lines in diam.; the disk blackish. Florets all 5-cleft

smooth fertile atropurpureous upwards in fl., blackish or black before and afterwards, the black eyelike disk of the heads contrasting singularly with the snow-w. opake shortly ovate mostly obtuse dry scales of inv.; female fl. in 1–2 rows. Recept. flat with a central conical papilla, strongly alveolate. Pappus in all the fl. in a single row the length of the fl., simple (not clavate) minutely rough or pubescent. Ach. minute dark chestnut oblong or oblong-turbinate 4-angular rough with glittering resinous dots.

β. rosea; heads blush-pink, the scales of inv. being rose, pink, or crimson at the base.—Mad. rrr, Portella de P^{to} da Cruz, Passo d'Area; PS., S^{r} J. M. Moniz. Cymes more dense compact and hemispherical perhaps than usual, but agreeing in all other points with the usual snow-w.-fld. state (*nivea*).

Sect. 3. *Asterantha* Lowe (*Xerochlæna* DC. in part). Heads hemispherical; scales altogether dry and scarious loose or spreading and finally stellately radiant golden or pale y., sometimes w. Pappus simple, rough or pubescent. Mostly stout erect herbaceous more or less tomentose pl. with large conspicuous heads clustered or single.

††4. H. FŒTIDUM (L.).

Hoary-grey or whitish clammy-tomentose; st. stout erect simple virgate leafy; lower l. oblong-lanceolate attenuate downwards, stem-l. cordate-amplexicaul acuminate erecto-patent, all w. and cottony beneath, light gr. subglabrescent or thinly furry-pustulate above; heads large stalked clustered in large compound terminal cymes; outer scales ovate, inner lanceolate longer than the florets, all acute or subacute smooth shining scarious.—DC. vi. 187; Gren. et Godr. ii. 185; Willk. et Lange ii. 60. *Gnaphalium fœtidum* Linn. Sp. 1197; Lam. Dict. ii. 751; Pers. Syn. ii. 418. *Anaxeton fœtidum* Lam. Ill. t. 692. f. 1.

β. citreum Less. ex DC. l. c.; heads subpanicled, inv. and pappus bright lemon-y.—Herb. ann. Mad. reg. 2, rrr. Seminaturalized here and there in two or three fields about Mr. Blandy's house at St. Antonio da Serra, from whose garden, where it still grows, it has evidently straggled within the last 10 or 15 years; observed also by S^{r} J. M. Moniz going thence towards the Levada dos Lamaçeiros in 1859 "remote from all cultivation;" but I have lately searched for it in vain in this locality, to which it was doubtless originally conveyed from the same garden. June-Oct.—St. mostly several from the crown, forming a close bush, simple stiffly virgate very stout hard and

woody downwards striate cottony 2–4 or 5 ft. high thickly clothed all the way up with short auriculato-acuminate stem-clasping l.; root-l. 5–6 in. long, 1–1½ broad, acute, all soft thin green and glabrescent above, whitish and thickly cottony beneath, the upper surface somewhat rough or minutely pustulate and furry; the whole pl. clammy and when touched or handled intolerably and nauseously fetid with a pungent most unpleasant smell like that of *Ballota nigra* L. Cyme terminal corymbose branched of numerous large close-crowded or congested handsome lemon-y. fl.; the branches tomentose and sometimes sprinkled with short red or purple horizontal distinct hairs or glands. Heads 8 or 9 lines in diam. of which the large flat velvety cushion-like dusky-yellowish disk is 4–6; compactly globose in bud; scales shining satiny of a permanent fine bright lemon-y. approaching to golden, radiately spreading, the outer shortly and broadly ovate subacute, the inner lanceolate acute slightly attenuate downwards not stipitate. Florets very small numerous and crowded forming a flat even velvety disk, the female in several rows. Recept. flat finely and equably alveolate altogether naked in the spec. Pappus very deciduous y. simple minutely rough or pubescent, the length of the florets. Ach. dark brown subquadrangular 4- or 5-ribbed covered with minute raised dots or points.

Gn. fœtidum Sims. BM. t. 1987, quoted by DC., has scarcely any resemblance to the Mad. pl., representing something in an early stage of inflorescence with pale gr. involucral scales, solitary separate not congested fl. and branches of panicle very stout short and robust copiously and conspicuously sprinkled with red glands.

Helichr. orientale (L.) DC. vi. 183, the common herbaceous "Everlasting" of garlands &c. (*Immortelle* Fr., *Perpetua* Port.) with y. or lemon-y. heads, included by Von Buch in his Mad. List p. 194. no. 256, is only now occasionally cultivated in pots or boxes about houses or in gardens.

25. GNAPHALIUM L.

1. G. LUTEO-ALBUM L.

Herbaceous annual *thickly snowy-tomentose or greyish-w.*; st. single loosely erect with several shorter ascending side shoots from the base or crown, all straight simple or shortly branched upwards, leafy; l. 1-nerved waved entire not spinulose at the edges, the lower oblong spathulate obtuse, upper *semiamplexicaul* ligulate or linear-oblong and more or less acute; heads ovoidal or cylindrico-campanulate sessile agglomerate in close compact crowded balls or tufts *forming a lobed conglobate leafless*

terminal *shortly branched cyme,* smooth and naked, loosely cottony quite at their base only; scales adpressed subequal oblong obtuse smooth shining *filmy-hyaline silvery-w. or pale straw-colour,* the outer with a gr. nerve; ach. minute naked finely punctulato-granulate.—Linn. Sp. ii. 1196; Lam. Dict. ii. 750; Desf. i. 266; Brot. i. 360; Pers. ii. 420; EB. t. 1002; Sm. E. Fl. iii. 411; Buch 194. no. 257; DC.! vi. 230; Koch 400; Seub. 32; WB. ii. 312; Bab. 179; Coss. et Germ. ii. 410; Gren. et Godr. ii. 187; RFG. xvi. t. 57. f. i.; Willk. et Lange Fl. Hisp. ii. 61. —Herb. ann. Mad. reg. 1, 2, c; PS. reg. 2, rr; GD. reg. 1, rrr. On moist rocks walls and in beds of ravines in Mad. everywhere below 2000 ft.; in PS. only in the Serra de Dentro;, not observed in ND. or SD. At all seasons.—This well-known almost cosmopolitan pl. occurs in the Cape Verdes as well as in the Can., Mad. and Açorian archipelagos. Whole pl. more or less snow-w. and tomentose-flaccid and quickly withering. St. 6–18 in. high somewhat slender erect, at first simple or with only a few short side branches downwards, presently, or when browsed down, with several ascending side branches from the base. L. flaccid undulate $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, 2–4 lines broad, the upper more or less acute or even acuminate. Cymes silvery-straw-colour or pure-w., shortly but distinctly branched, composed of several globose tufts of densely crowded always simply ovate or ovoidal heads. Florets rather numerous all fertile varying from pale to dark y. or orange and often (especially the female) tipped with pink, blood-red or crimson. Heads $1\frac{1}{2}$–2 lines long, 1 line broad, copiously woolly quite at the base, in fl. simply ovoidal; scales finally radiant. Recept. slightly convex papulose. Pappus pure w. very fine and deciduous, rough simple. Ach. excessively minute not half a millim. long, light yellowish brown or fulvous, linear-oblong with straight sides, angular and rough with minute shining or pale points.

††2. G. SPATHULATUM Lam.

Herbaceous ann. *thinly or loosely tomentose light-gr.*; st. at first single erect mostly short with several longer stout weakly procumbent or ascending side branches from the base or crown, all mostly simple or with short side branches, leafy; l. 1-nerved entire *greenish thinly tomentose or cobwebby and almost naked or glabrescent on the upperside,* oblong-spathulate or obovate, *attenuated downwards into rather long or distinct petioles,* the lower obtuse, the upper mostly subacute, *all distinctly mucronulate*; heads small *lageniform,* in fr. shortly cylindrico-campanulate, sessile agglomerate in dense cottony *axillary tufts forming an often interrupted or irregular leafy short thickish oblong obtuse or rounded crowded simple terminal spike,* each head gr. and loosely but *copiously tomentose halfway up,* yellowish-brown naked and shining above; scales *gr. with pale yellowish or*

brownish membranous tips and edges, the outer oblong subacute, the inner linear acute or acuminate and almost altogether shining naked smooth and scarious like the tips of the outer; ach. minute naked pale subpellucid straw-colour.—Lam. Dict. ii. 758 (not Burm. or Thunb.). *G. americanum* Willd. Sp. Pl. iii. 1887 (not Mill., Sw. and excl. syn. Sw., Sloane and Brown); Pers. Syn. ii. 21 (excl. syn. Sw.). *G. Pennsylvanicum* Willd. Enum. 867; DC. vi. 235; Seub. Fl. Az. 32. "*Gn. obtusifolium* hortul." ex Lam. et DC. (not Spr. sec. DC.).—Herb. ann. Mad. reg. 1, rrr. This pl. came up first as a weed in a box of *Hoya carnosa* in my garden on the Caminho do Valle near Funchal in 1830, without any trace of its origin, soon becoming naturalized in the walks and borders. It has been lately observed in a neighbouring garden under similar circumstances by S^r^ J. M. Moniz. May.—Habit much like that of *G. luteo-album* L. but with the lower branches more produced at the expense of the main st. stouter longer and more procumbent, and at once distinguished by its thinly cottony or cobwebby light-yellowish-gr. foliage. Luxuriant spec. are sometimes (as also in *G. luteo-album*) branched all the way up the main st. and 2 ft. high: but usually the main st. is from 4 to 12 in. high, and the side-shoots from its base 6–12 long. L. larger than in *G. luteo-album*, more broadly spathulate and attenuated into long distinct petioles, not amplexicaul, 1–2½ in. long, 3 or 4 to 6 or 8 lines broad; their upperside nearly naked, the underside like the st., and heads more cottony. Heads in fl. shaped like a flask or bottle with a globose gr. woolly base and naked shining pale yellowish brown or fulvous narrow neck; but in fr. or in dried ex. they become simply cylindrico-campanulate. They are not corymbose but densely aggregate in leafy cottony terminal short thick obtuse spikes or axillary tufts. Florets much fewer than in *G. luteo-album*, and paler, the outer of the palest possible straw-colour and only the 2 or 3 inner perfect fl. really y., all turning presently pale drab with a very slight tinge of red. Scales of inv. not silvery, their tips only naked and shining y.-brown. Recept. after the fr. has fallen concave or cup-shaped with the involucral scales reflexed. Pappus copious pure-w. very deciduous fine and minutely rough. Ach. excessively minute, ½ a millim. long, broader and paler than in *G. luteo-album*, shortly and thickly oblong with slightly convex sides, subobtuse at each end, like little rice-grains or ants' eggs, shining naked subpellucid very pale dull greenish straw-colour, subangular, minutely scabrous with raised points.

G. spathulatum Burm. (A.D. 1738–9) being a *Helichrysum* (*H. crispum* (L.) β DC.), Lamarck's name for the present pl. (1786) takes precedence of Thunberg's *Gn. spathulatum* (1794 or 1813)=*Leontonyx spathulatus* Less., DC., and all others.

There are two sheets of this pl. in BH. named in pencil "*G. purpureum*"—one, "Herb. Mill.," in an unknown hand, the other, "Hort. Vindob. Jacq.," by Dryander. The true *G. purpureum* L. (Dill. Elth. t. 109. f. 132) seems very distinct.

26. Filago L.

§ 1. Scales of inv. cuspidate opposite in 5 rows, not finally radiant; recept. naked filiform. (Godr.)

†1. F. micropodioides Lange.

Loosely thickly and copiously grey-tomentose or densely woolly. St. numerous from the crown of the root decumbent or ascending, often procumbent, rarely with an erect main st., 2–3 times proliferously 2–3-fork-branched leafy; l. linear-lanceolate or ligulate acute or subobtuse and mucronate loosely erecto-patent crowded but not imbricate or narrowing at the base, the lower only sometimes spathulate; heads small half buried in loose tomentum aggregate 10–15 together in sessile globose or hemispherical leafy involucrate very woolly tufts or glomerules in the forks or at the ends of the branches, the involucral br. or l. numerous gr. conspicuous woolly acute or mucronate equalling or a little exceeding the tufts of heads and forming a distinct frill or coronet beneath them; scales of inv. linear-lanceolate carinately nerved and cuspidate or aristato-acuminate, woolly halfway up or more, their fine subulate or awn-like erecto-patent points naked shining pale greenish straw-colour, often partly red or crimson, finally pale brown, conspicuously prominent and produced beyond the tomentum, longer than the pappus.—Willk. et Lange Fl. Hisp. ii. 55. *F. germanica* Buch 195. no. 273 (not Linn.); WB. ii. 305 partim? (excl. syn.).—Herb. ann. Mad. reg. 2, rr; SD. reg. 2, rr; "Desertas," S^r^ Moniz. Chão da Ribeira above Seixal in dry bed of the torrent; Quinta do Pico do Infante near Funchal, a weed in the garden; "Sitio do Til in Rib. Brava," S^r^ Moniz. S. Des^a^ at top. May–July.—St. numerous from the crown 4–6 in. high ascending or decumbent rarely and then only at first with an erect main st. not longer than the rest, often procumbent and forming mostly a bushy tuft branched all the way up. L. crowded numerous but altogether (especially the lower) loose and scattered, those of the st. erecto-patent narrow-oblong or ligulate, the lower sometimes broader and subspathulate, all either subacute or mucronate. Heads or *anthodia* about the size of those of *F. canescens* or *F. eriocephala*, Jord. Obs. t. 7. ff. A, D, suberect or indistinctly (not stellately) spreading, deeply plunged halfway up or more in *tomentum*, aggregate 10–15 together in hemispherical conspicuously multi-

bracteate or leafy-involucrate densely woolly glomerules, terminal or sessile in the upper 2–3-chotomies or forks of the st. upwards. Involucral br. distinct conspicuous numerous, i. e. 6–8 or 10 leafy ligulate acute or mucronate short and scarcely rising above the glomerules, but forming a distinct complete suberect or erecto-patent many-leaved coroniform ruff- or frill-like involucre to them. Scales of *anthodium* lax erecto-patent narrow linear-lanceolate carinate; the nerve excurrent and more or less produced into a shining naked subulate prominent awn-like point prolonged considerably above or beyond the pappus or tomentum of the heads. In the dried spec. it is impossible to discern whether the heads were originally sharply and deeply angular or otherwise.

This sp. differs strikingly from *F. spathulata* Presl and *F. germanica* L. in its much greater and looser woolliness, in its mostly bushy branchy habit and numerous ascending or decumbent st., in its smaller thickly and loosely woolly multibracteate or polyphyllous glomerules (reminding one a little of *Leontopodium*) with the aristate points only of the scales rising erectly out of the tomentum and surrounded with a conspicuous frill or coronet of 6–8 or 10 leafy ligulate acute woolly involucral bracts. *F. germanica* L. has the heads more numerous and closely packed in much larger naked spheroidal glomerules and stellately prominent all round like the spikes of a calthrop or Morgenstern and rising quite out of the tomentum at their base. In *F. spathulata* Presl the heads are considerably larger and more distinctly prominent than in the present pl., rising also clear out of their tomentum.

§ 2. Scales of inv. not cuspidate, all or at least the inner alternate in 3 or 4 rows, finally radiant. Recept. short dilated and flattened at top. (Godr.)

2. F. MINIMA (Sm.).

Closely adpressedly and densely snowy-tomentose; st. often dwarfish stiff slender erect or ascending single or numerous, fork-branched upwards, leafy; l. erect imbricate flat linear-lanceolate or ligulate acute; heads conoidal strongly 4–5-angular closely and adpressedly tomentose, aggregate 3–10 together in small sessile leafy-involucrate stellately radiant tufts or glomerules in the forks or at the ends of the branches, their leafy acute br. shorter than the tufts or glomerules themselves but numerous; outer scales of anthod. 5 ovate-lanceolate gr. woolly

strongly carinate, inner 5 scarious naked shining narrower linear-lanceolate acute not longer than the pappus; ach. pale oblong or elliptic frosted with glittering spherical dots or papillæ.—Pers. ii. 422; "Fr. Nov. 268;" Koch 398; Gren. et Godr. ii. 193; Bab. 179; RFG. xvi. t. 55. f. i.; Willk. et Lange ii. 55. *Gnaphalium minimum* Ray Syn. 181; Sm. in EB. 1157; Sm. E. Fl. iii. 417; Hook. Fl. Scot. i. 241; "Lois. Fl. Gall. ii. 226." *Filago montana* DC. vi. 248; Coss. et Germ. ii. 408 (not Linn.). *Gnaphalium montanum* β Lam. Enc. ii. 760. *Filago arvensis* DC. vi. 248 quoad solum hab. "Maderæ" (not Linn.).—Herb. ann. Mad. reg. 3, cc; GD. reg. 2, rr. Mountain pastures everywhere above 3000 ft., e. g. about the Primeira Vista do Curral, up the Caminho do Meio, Pico da Silva, towards the Pico do Areeiro, &c.; highest peaks in the GD. June, July.—St. 2–6 in. high stiffly erect single or with numerous ascending side st. from the crown, each mostly fork-branched at top but often in the short mountain turf simple dwarfed and bearing only one or two confluent sessile glomerules of heads. Whole pl. adpressedly cottony greyish-w. L. numerous erect and imbricately crowded on the st. 2–3 lines long, ½ line broad. Heads small scarcely more than one line long conical angular pale greenish straw-colour or brownish collected in indistinct subconfluent or (towards the ends of the branches) subspicate small glomerules, which are tomentose and surrounded by several involucral l. or leafy bracts shorter or not overtopping the glomerules themselves. Tips of the scales acute but not subulate or aristate or longer than the pappus.

Some Mad. spec. of this pl., sent by me to the late Chev. DeCandolle, wrongly ticketed "*F. germanica*," and referred by him in reply *in litt.* 15 Feb. 1834 to "*F. montana*," were most probably his sole authority for attaching afterwards the habitat "Maderæ" to his *F. arvensis* L. (Prodr. vi. 248)—RFG. xvi. t. 55. f. ii.; Willk. et Lange Fl. Hisp. ii. 56—a pl. not really hitherto discovered in Mad. and which is, according to Koch (ed. 2) 398 and Hartmann (Annot. Pl. Scand. Herb. Linn. pp. 140, 141), a mere form (*β arvensis* Hartm. = "*F. montana* b Fr. Novit. ed. 2. 267") of *F. montana* L.

No spec. of *F. minima* (Sm.) exists in the Linnæan Herb., and it appears to have been quite unknown to him.

27. Xerotium Bluff et Fing. (partim).

1. X. gallicum (L.).

Greyish or silvery gr. somewhat sparingly and thinly silky-tomentose; st. slender erect bushy, branched at the base and

top, branches dichotomously paniculate; l. linear narrow-elongate acuminate, the upper erect, lower squarrosely spreading or recurved; heads ovato-pyramidal or conoidal, prominently but obtusely 3–5-angular closely cottony nearly to the top, the tip only naked scarious and coloured, sessile in distant leafy knots of 2 or 3–5 or 6 together in all the forks or at the ends of the branches or short lateral branchlets, involucrate conspicuously with several bracteating l. much longer than themselves: outer scales of inv. 5 lanceolate gibbous at the base woolly as long as the inner which are scarious pale brown or straw-coloured, all acute or subobtuse and not longer than the pappus; inner ach. as in *Filago minima* (Sm.).—Bluff et Fingerh. "Fl. Germ. ii. 344." *Filago gallica* Linn. Sp. ii. 1312; Vill. Dauph. iii. 195; Desf. ii. 307; Brot. i. 362; Pers. ii. 422; DC.! vi. 248; Koch 398; Seub. Fl. Az. 32; WB. ii. 307; Bab. 179; RFG. xvi. t. 56. f. i.; Willk. et Lange iii. 56. *Gnaphalium gallicum* Lam. Enc. ii. 759; EB. 2369; Sm. E. Fl. iii. 417. *G. vulgare medium* Moris. § 7. t. 11. f. 14.—Herb. ann. Mad. reg. 2, r. Fields and roadsides; east of the Mount Church on the brink of the Curral dos Romeiros; road to Caniço above the Brazen Head; Praça behind the beach at S^{ta} Cruz; 3 or 4 miles up the Machico valley; cornfields, S^{ta} Anna towards Pico Ruivo; S. Vicente towards the Forno de Cal, &c. July–Sept.—At once distinguished by its long very narrow more or less squarrose l. and heads in leafy knots rather than glomerules, giving it much the habit of a *Scleranthus*. St. 4–6 or 8 in. high mostly repeatedly fork-branched and bushy upwards with numerous ascending side branches at the base or crown, all very slender loosely and thinly silvery-tomentose. L. about 4 or 5 lines long, scarcely half a line broad, flat, finely pointed, somewhat greener or more thinly cottony than in *Filago minima*. Heads inconspicuous yet rather larger ($1\frac{1}{2}$–$1\frac{3}{4}$ line long) more swollen at the base and drawn out at the top than in that pl., with merely the tip naked and pale brown or straw-coloured and sometimes tinged with red, the rest below w. and woolly, collected in distinct subremote inconspicuous leafy knots of from 2 or 3 to rarely 7 or 8 together; the several (rarely 1 or 2) involucrating br. or l. rising conspicuously above them. Scales of inv. in 3 rows. Ach. ribless, the inner free and sprinkled with glittering dots, the outer row enclosed each in one of the middle row of involucral scales cohering round it into a hard thickened tube or pseudopericarp, without dots or pappus.

I must here earnestly invoke all botanists to unite in utterly repudiating and putting down such scandalously childish, bald and witless trickery with names as the anagrammatic formations by Cassini of *Logfia, Gifola, Oglifa, Ifloga*, &c. from *Fi-*

lago, *Phagnalon* from Γνάφαλον or *Gnaphalium*, *Obœjaca* from *Jacobœa*, *Sogalgina* from *Galinsoga*, *Mantisalca* from *Salmantica*, &c.,—not only by refusing uniformly to adopt, but by omitting as much as possible even to quote them for synonyms. No priority of date can plainly justify the adoption or perpetuation of such unseemly barbarisms, seeing that they really neutralize or undermine the very principles of all technical or scientific nomenclature, and evade or indirectly violate, by the mere change of place in the letters or syllables of a word *already used*, the very law of priority itself. That law indeed is but a means to an end, viz. the establishment of a permanent technical nomenclature, and therefore may sometimes on special grounds be properly infringed,—whereas the consequence of yielding currency to such base name-coinage, whether in Zoology or Botany, must be eventually to defeat the end itself, and not to establish but to depreciate the use and value of scientific nomenclature altogether—besides tending to repel, or inspire with disgust and contempt for the pursuits in which such puerilities are tolerated and kept up, every one of common taste or education.

Tribe XVI. *Calenduleæ* Less.

The Marigold Tribe.

28. Calendula L.

Marigolds.

†††1. C. officinalis L. *Cuidados.* **Marigold.**

Herb. ann. somewhat glandular and viscous; st. stout erect stiffly and compactly bushy, thickly and closely leafy; l. crowded furry-pubescent full gr. broadly ligulate- or lanceolate-oblong acute amplexicaul mostly entire; fl. 40–50-rayed; ach. all incurved unarmed muriculato-rugose at the back, the outer shortly and broadly boat-shaped winged with smooth dilated involute borders, the inner longer linear-hornshaped subtriquetrous falcate or annular with or without beaks.—Linn. Sp. 1304; Brot. i. 399; Lam. Enc. vii. 275; Pers. ii. 492; BM. 3204; DC. vi. 451; Koch 451 (sub *C. arvensi* L.); Seub. Fl. Az. 32; Coss. et Germ. ii. 405; RFG. xv. ff. i., ii., iii.; Willk. et Lange Fl. Hisp. ii. 126. *Caltha vulgaris* Moris. iii. 13. § 6. t. 4. f. 1. —Herb. ann. Mad. reg. 1, 2, e; PS. reg. 1, c. In gardens

cult. everywhere, and naturalized here and there, especially at Seixal.—Forms a low thickly leafy compact stiffly upright bush 8–12 in. high, with short stout thickish branches and copious full-gr. slightly aromatic clammy foliage. L. 2 or 3 in. long and ¾–1 in. broad, somewhat succulent and minutely pustulato-punctulate, broader and much less attenuated downwards than in the two following sp. or broadly amplexicaul, rarely with here and there a tooth. Fl. 1½–2 in. in diam. scented, mostly bright full orange. Scales of inv. viscous linear, the inner row alternate with and narrower than the outer. Heads in fr. forming a flat level-topped disk. Ach. numerous crowded compact, of uniform regular height, the inner brown or blackish, the outer pale or straw-coloured. Varr. :—

α 1. Disk and ray uniform orange, ccc.

α 2. Disk and ray uniform pale y., rr.

β. Disk dark purple, ray orange, r.

α varying also with entirely ligulate or double orange fl.

2. C. ARVENSIS L. *Vaqueira.*

Herb. ann.; st. somewhat slender and diffusely branched; l. scattered subremote furry-puberulous light-gr. ligulate or oblong-lanceolate remotely subdenticulate semiamplexicaul acute; fl. 20–30-rayed; ach. all incurved, the outer 5 or 6 elongate linear-falcate suberect long-beaked armed or cristato-echinate with long uncinulate dorsal spines and a strong inwardly projecting spine-like tooth or spur at their inner base, the next inner row of 5 or 6 unbeaked shortly and broadly boatshaped or winged with involute dilated margins and armed or unarmed at the back, the rest narrow-hornshaped or annularly falcate unbeaked and unarmed but cancellately and muricately ribbed transversely at the back in regular rows.—Ger. p. 603. f. 10; Linn. Sp. 1303; Brot. i. 400; Lam. Enc. vii. 275; Pers. ii. 492; Buch 195. no. 271; DC.! vi. 452; WB. ii. 341; Koch 451; Coss. et Germ. ii. 405; Gr. et Godr. ii. 197; RFG. xv. t. 159. f. iv.; Willk. et Lange Fl. Hisp. ii. 125. *Caltha arvensis* Moris. ii. 14. § 6. t. 4. f. 6. *Calendula amplexifolia* Reichb. in Höll's List? Hook. J. of Bot. i. 19. Herb. ann. Mad. reg. 1, 2, ccc; PS. reg. 2, 3, cc. Vineyards, cornfields, roadsides, &c. everywhere, a universal most abundant weed in and about cult. ground. Throughout the year, but chiefly March–June. —At once distinguished from *C. officinalis* L. by its smaller paler fewer-rayed fl. paler foliage and weaker diffusely branched habit. St. very variable in size and luxuriance, often simple and only 2 or 3 in. high yet 1- or 2-fld., scarcely ever more than 8 or 10 in. long and loosely branched, subremotely leafy. Fl. ¾–1 in. in diam. pale tawny-y. The 4 or 5 outer seeds are

5 or 6 lines long including their long smooth often irregularly 2–3-forked beaks, at first strongly incurved, but opening and becoming erect as they ripen. Sometimes 2 or 3 others of the same row are shortly boatshaped and as broad as long with dilated shining parchment-like pale transparent margins, giving them a bladdery appearance. Some of those of the disk have similar but narrower and less conspicuous margins; others are simple and perfectly annular. The outer hornlike seeds are pale slaty brown or ash-colour and their dorsal spines often with bifid points.

Below 1000 ft. this pl. in spring carpets almost every piece of waste or fallow ground with its bright orange-y. fl.

3. C. MADERENSIS DC. *Vaqueira* or *Vacão.*

Herb. subper. suffrutescent downwards, viscous; st. numerous slender elongate diffusely spreading stragglingly procumbent or decumbent; l. crowded downwards, subremote or scattered upwards, furry-puberulous, the lower oblong-spathulate much attenuated downwards obtuse, the upper ligulate or lanceolate sessile or semiamplexicaul acute, all mostly quite entire; fl. 10–20-rayed; ach. straight or slightly incurved hispid and muricate at the back, the outer partly and chiefly broadly triangular short unbeaked or shortly beaked triquetrously crest-winged (the 2 dorsal wings lacerately toothed or crest-like) and partly occasionally straight linear simple hornlike with a long sword-like beak; the inner irregular mixedly beaked or unbeaked falcate or incurved with inflexed margins but not winged, subcylindric ribbed inside, muricate or spinoso-echinulate at the back.—DC.! vi. 454; Novit. 539 or 17. *C. maritima* Lowe in Hook. J. of Bot. i. 36 (not Guss.). *C. amplexifolia* Reichb. in Höll's List in Ratisb. Fl. (1830) p. 382 and Hook. J. of Bot. i. 19?—Herbaceo-suffrut. subper. or at least bien. Mad. reg. 1, $\frac{r}{2}$; ND. ccc; GD. reg. 1, cc; SD. reg. 1, c. Banks and cliffs along the sea-shore, P^{ta} de São Lourenço from the Piedade outwards. N. coast at S^{ta} Anna, the Entrosa, S. Vicente, P^{to} Moniz, &c. Not seen in PS. At most seasons but chiefly from Dec. to June.—A much larger stouter pl. than *C. arvensis* L. with widely straggling branches spreading all round from the crown 1–2 or 3 ft. long, prostrate at first, then ascending, more and more remotely leafy upwards, hoary and tomentose whilst young with long w. clammy hairs, angular, woody and suffrutescent downwards. L. 2–3 in. long, $\frac{1}{2}$–1 in. broad, densely tufted or crowded at the base of the st., pale gr., but except while young not hoary, entire or only remotely and obscurely repand-toothed. Fl. about halfway in size and colour between those of *C. officinalis* and *C. arvensis*, $\frac{3}{4}$–1 in. in diam. with fewer narrower longer and

remoter rays than either. Outer row of seeds large, all mostly triquetrously winged, the 2 dorsal angles being expanded into broad thin subfoliaceous irregularly jagged or coarsely pinnatifid-toothed flat broad crests or wings with the intermediate dorsal space shortly muricate; the 3rd inner angle or midrib inside also winged but more or less entire. The inner seeds simple subulate or slightly winged, rugoso-muricate at the back, and like the rest viscoso-glandular till ripe.

The principal crop of fl. and fr. is from Jan. to May. But these, with their branches, having died away, another set is put forth in the following autumn from the lower part of the former st.

C. amplexifolia Reichb., "ach. . . . . externis triangularibus dorso dentatis," might possibly have been this sp., but that it is said to have been found by Mr. Höll "near the city" (Funchal), where *C. arvensis* L., otherwise omitted by him, abounds, and *C. maderensis* does not occur. In any case, however, the definition is too imperfect to warrant its quotation otherwise than as a synonym.

Table of Genera.

II. CAPITIFLORÆ. (CYNAROCEPHALÆ Vaill., Juss. &c.)

§ 1. *Anthers ecaudate or awnless at the base.*

Tribe XVII. SILYBEÆ.

29. *Galactites.*
30. *Silybum.*

Tribe XVIII. CARDUINEÆ.

31. *Cynara.*
32. *Notobasis.*
33. *Cirsium.*
34. *Carduus.*

Tribe XIX. CENTAURIEÆ.

35. *Centaurea.*
36. *Microlonchus.*

Tribe XX. CARTHAMEÆ.

37. *Kentrophyllum.*
38. *Carduncellus.*
39. *Carthamus.*

§ 2. *Anthers caudate or awned at the base.*

Tribe XXI. CARLINEÆ.

40. *Carlina.*
41. *Lappa.*

Suborder II. CAPITIFLORÆ. (Cynarocephalæ Vaill., Juss. &c.)

§ 1. *Anthers ecaudate or awnless at the base.*

Tribe XVII. *Silybeæ* Less.

29. Galactites Mnch.

1. G. tomentosa Mnch. *Cardo.*

The only sp.—Pers. ii. 488; DC.! vi. 616; Seub. Fl. Az. 32; WB. ii. 381; Gren. et Godr. ii. 202; RFG. xv. t. 88. f. i.; Willk. et Lange Fl. Hisp. ii. 200. *Centaurea galactites* Linn. Sp. 1300; Lam. Enc. i. 677; Cav. Ic. iii. 16, t. 231; Desf. ii. 303; Brot. i. 372. *Carduus galactites* Buch! 194. no. 246.—Herb. ann. Mad. reg. 1, 2, 3, ccc; PS. reg. 1–4, ccc. GD. reg. 2, ccc. Cornfields, waste and cult. ground, banks, roadsides, beds of ravines and mountain pastures everywhere, a universal and abundant weed, forming a great part of the fodder collected for cattle. Apr.–June, but also partially from Febr. to Nov.—Habit entirely of a Thistle (*Carduus* or *Cnicus*). St. ½–2 ft. high but usually 9–18 in., strongly ribbed and angular, hollow cottony erect branched upwards. L. narrow-oblong or ligulate cottony-w. beneath, dark gr. (especially when growing more luxuriantly in moist or rich soil), above glabrescent or cobwebby with milky veins, pinnatipartite or runcinato-pinnatisect, the divisions toothed and finely acuminato-spinous, triangular-lanceolate, the st.-l. subauriculately amplexicaul and the upper more or less decurrent; the spines y. not strongly pungent. Heads terminal solitary or 2 or 3 together, about ½–1 in. in diam. the scales subcoriaceous ovato-lanceolate produced into finely acuminato-subulate or linear-cuspidate sharply pungent erecto-patent spines transversely or interlacingly cobwebby or cottony at the base. Fl. conspicuous loosely subradiant light purple or lilac rarely w. sweet-scented and often in the mountains perfuming the air like Lilac-fl. Ach. small pale testaceous or light yellowish drab, with 10 darker longitudinal fine lines or striolæ, very smooth and shining as if enamelled, 2 lines long, ½–¾ line broad; epigynous disk with an entire raised tumid ring, crown or border enclosing an oval hollow with a central permanent large erect truncate prominent mamilla.

β. *crinita*; upper l. simple undivided nearly or quite unarmed and entire linear-elongate flagelliform produced into long narrow finely acuminate curled or recurved points.—A very singular state or var. with long linear upper and floral l. tortuously curled or dishevelledly entangled and only about

a line broad, found in cornfields about the Piedade on P^ta^ de São Lourenço (where I have also noticed it) in May 1865 by S^r^ Moniz.

†30. Silybum Vaill.

†1. S. Marianum (L.). *Cardo de S^ta^ Maria.* **Our Lady's, Holy,** or **Milk Thistle.**

The only sp.—DC. ! vi. 616; Koch 458; WB. ii. 383; Coss. et Germ. ii. 388; Gren. et Godr. ii. 204; Bab. 190; RFG. xv. t. 151; Willk. et Lange Fl. Hisp. ii. 201. *Carduus Marianus* Linn. Sp. 1153; Desf. ii. 246; Brot. i. 341; Pers. ii. 386; EB. 976; Hook. Fl. Sc. i. 236; Sm. E. Fl. iii. 386. *Carthamus maculatus* Lam. Enc. i. 638, 639. *Carduus Mariæ* Ger. 989. *C. albis maculis notatus* CBP. Moris. iii. 155. § 7. t. 30. f. 1. —Herb. ann. Mad. reg. 1, r; PS. reg. 3, rr; GD. reg. 2, cc; SD. reg. 2, c/2. Roadsides and borders of fields or waste ground. Along the road from Funchal to Caniço at S. Gonçalo; P^ta^ de S. Lourenço near the Piedade; "P^ta^ do Pargo at the Pico das Favas," S^r^ Moniz. PS., Pico do Concelho; GD. and SD. at top. May–June. — A smooth stout robust erect sparingly branched pl. not above 2 or 3 ft. high with very large few solitary terminal heads and handsome large broad smooth shining conspicuously milky-veined or marbled foliage. St. striate slightly cottony upwards. L. 6–12 in. long, 3–4 or 5 broad, those of the st. cordato-amplexicaul, all widely sinuato-pinnatifid waved and toothed, the teeth produced into fine short subulate stiff pungent spines. Heads light gr. globose or globosely ovate concave at the insertion of the ped., very large hard and formidably spinose 1½–2 in. in diam. exclusive of the excessively strong and pungent spreading or recurved spines, which are about an inch long, canaliculate above, and fringed or ciliate with short spinules at the base. Scales smooth coriaceous close-pressed, the outer expanded at top into a stiff leafy triangular or ovate appendage fringed with short fine spinules and produced into the long stiff gr. spines above described. Flts. purple. Ach. large broadly and shortly ob-ovate-oblong, sometimes a little gibbous, 3 lines long, half as broad, abruptly dark brown or black below the ring or collar at top and streaked or lineolated upwards longitudinally with pale testaceous brown or fulvous, smooth and shining but minutely and very obsoletely rugulose transversely; the raised tumid entire ring or border of the epigynous disk with its very large central permanent conoidal obliquely incurved prominent mamilla cream-colour or pale ochraceous. Hairs of pappus shortly rough or pubescent; of recept. smooth long and copious chaffy-setaceous or flat and linear.

The poetic religious imagination of old legends, which found

. . . . . "tongues in trees, books in the running brooks,
Sermons in stones, and good in everything,"

saw in the milk-stained leaves of this fine thistle a memento of the Virgin Mary's Flight with the infant Saviour into Egypt.

Tribe XVIII. *Carduineæ* Less.

31. Cynara L.

1. C. Cardunculus L. *Cardo da gente.*

St. normally branched with several fl., often dwarfed 1-fld.; l. sessile or semiamplexicaul not decurrent spinous pinnatipartite, snowy crustaceo-tomentose beneath, smooth or glabrescent and hoary-gr. above, the lobes or segm. decurrent narrow linear-lanceolate elongate-acuminate (in the upper l. caudate or flagelliform) spinoso-pinnatifid, or toothed; outer scales of inv. coriaceous ovate or ovate-lanceolate cuspidate or acuminato-spinose.—Linn. Sp. 1159; Desf. ii. 248; Brot. i. 339; Pers. ii. 384; DC. vi. 620; Koch 458; Coss. et Germ. ii. 383; Gren. et Godr. ii. 206; RFG. xv. t. 152; Willk. et Lange Fl. Hisp. ii. 180. *C. sylvestris* Lam. Enc. i. 277; Ger. p. 992.

β. *ferocissima*; densely spinose especially towards the bases of the l. and their segm.; spines long slender subulate very sharp and rigid pale brown or y. mostly 2–3-nate or fasciculate and connately combined and crowded at the base of the l. or their segm., segm. of upper l. elongate finely caudate or flagelliform; outer scales of inv. acuminato-spinous sharply pungent; st. often dwarfed and 1–3-fld.—*C. horrida* Ait.! Pers. ii. 384; Buch! 194. no. 248; Fl. Gr. t. 834; DC. vi. 620; Lowe Novit. 19 or 541; WB. ii. 384, t. 114 (descr. locupletissima opt.).—Herb. per. Mad. reg. 1, r; PS. reg. 3, $\frac{c}{2}$. Open grassy slopes and mountain pastures, in Mad. only between Machico and Caniçal and onwards towards the Piedade on Pta de S. Lourenço; in PS. on most of the mountains, growing singly or sometimes gregariously in the short turf. July–Oct.—L. forming a large thick conspicuous spreading hoary grey or whitish flat thick tuft or rose, 6–12 in. long, 3–6 broad, formidably and thickly armed especially towards their base with excessively sharp fine subulate straight slender rigid woody spines often an in. long of a pale brown or y. col. From the centre rises the single often simple and 1-fld. short stout erect straight hard stiff evenly striated st. $\frac{1}{3}$–$1\frac{1}{2}$ ft. high, hoary-tomentose, occasionally in luxuriant ex. branched and 8 or 9-fld. Heads large 2–3 in. in diam. smooth like those of the common garden Artichoke (*C. Scolymus* L.) but with the scales produced

into long strong cuspidate sharp spines. Fl. deep lavender or indigo-blue turning purple in drying, rarely w., with a strong fragrance like honey or the fl. of *Scabiosa atropurpurea* L. Stigmas very long (6–8 lines) exserted slender filiform distinctly separate or bifid at the tip. Ripe ach. not seen.

The main rib of the l. and even the still more bitter large strong thick and blackish roots are eaten raw by the poor half-starved shepherd boys of Caniçal and P^to^ S^to^.

Nothing can be more different in aspect than the present pl. and its presumed derivative by cult., the garden-Cardoon or broad-leaved unarmed var. *β* DC. (BM. t. 2862, and I may add BM. t. 3241), which has the broad segm. of the l. merely feebly and inconspicuously mucronulate and the involucral scales shortly and obtusely pointed but not elongately spinose. The common garden-Artichoke (*C. Scolymus* L.) is also probably merely another cult. form of the same pl. It is occasionally cultivated in Mad.

†32. Notobasis Cass.

†1. N. syriaca (L.).

The only sp.—DC. vi. 660; WB. ii. 379; Gren. et Godr. ii. 207; Willk. et Lange Fl. Hisp. ii. 182. *Carduus syriacus* Linn.! Sp. 1153; Lam. Enc. i. 702; Desf. ii. 245; Pers. ii. 389. *Cnicus syriacus* Brot. i. 342; Fl. Gr. t. 831. *Cirsium syriacum* Gärtn., Spr. iii. 877. *Carduus lacteus syriacus* Cam. Moris. iii. 155. § 7, t. 30. f. 5. *Acarna minor &c.* CBP. Moris. iii. 161. § 7, t. 34. f. 5.—Herb. ann. Mad. reg. 1, r. P^ta^ de São Lourenço about the Piedade amongst cornfields in waste ground and on sunny barren slopes, as also halfway between Funchal and Caniço above the Brazen Head; P^ta^ do Pargo at the extreme point on Pico das Favas. May, June.—A fine but formidably and ferociously prickly pl. St. single 1–3 or 4 ft. high straight erect virgate simple or with only short side fl.-branches above the middle, ribbed or striated and slightly cottony or cobwebby. L. lanceolate-oblong stiff waved and sinuato-pinnatifid strongly and copiously spinous, smooth or glabrescent and shining above, bright gr. with w. milky veins and furry-cobwebby beneath; st.-l. auriculate sessile or semiamplexicaul not decurrent, the upper pinnatipartite or reduced almost to their nerves and spines, the latter very strong and pungent pale brown 2–3-nate and forked or divaricate. Heads ½–1 in. in diam. agglomerate 2 or 3 together at the ends of the short side branches, 3 or 4 or more crowded at top of the main st., each on its own short

ped. and furnished at the base with 2–5 spinous leafy br. longer than the tufts of heads and similar to the upper st.-l. Fl. purple rather large and handsome. Scales of the ventricose anthod. gr. slightly cobwebby narrowly ovato-acuminate or linear-lanceolate cuspidate with sharp but not strongly pungent spreading subrecurved points. Recept. densely villous, the hairs nearly an inch long. Pappus elegantly plumose very caducous, hairs 8 or 9 lines long, dilated golden-y. and crumpled at the base. Ach. quite smooth and even, uniform plain dull dark brown not shining, obliquely obovate and gibbous at the back, compressed, 3 lines long, 2 broad, simple and obtusely rounded at top; *hilum* minute oblique; epigynous disk small oblique without any crown, border, or central mamilla.

The fl. are said to be sometimes w. but have not occurred so in Mad.

33. CIRSIUM Tournef., DC.

Sect. *Onotrophe* Cass., DC. Involucral scales of the globose or globosely ovate heads all unarmed or feebly spinulose. L. with short feeble marginal spinules.

1. C. LATIFOLIUM Lowe. *Tangerão manso.*

Unarmed corymbosely branched upwards; l. sessile auriculato-amplexicaul all undivided broadly elliptic-oblong obtuse snowy-floccose-tomentose beneath, glabrescent and shining above, spinuloso-ciliate, the lower doubly serrato-crenate, the upper entire; heads erect ebracteate solitary terminal remote on long leafy floccose ped. or branches forming a wide lax remotely or somewhat few-fld. cyme, globose or hemispherical hard compact nearly naked or glabrescent; scales coloured unarmed acute shortly and feebly mucronulate woolly-ciliate only at the edges adpressed, the outer ovate or ovate-oblong, inner linear or ligulate.—Prim. p. 28. no. 48; DC.! vi. 653. *Carduus latifolius* Sol. in BH.!—Herb. per. Mad. reg. 3, cc. On moist steep banks and perpendicular rocks in the principal ravines abundantly; Rib. de S^{ta} Luzia at the Waterfall, R. da Metade, de Fayal, de S. Jorge, da Bõa Ventura, Serra d'Agua under Pico Grande, &c. June–Aug.—Very distinct from its near ally *C. heterophyllum* (L.). Root subfasciculate, the divisions fleshy tap-shaped whitish like young parsnips several as thick as the fore finger, sweetish and not unpleasant to the taste, and when boiled firmer but resembling in taste the tubers of Jerusalem Artichokes (*Helianthus tuberosus* L.). St. single corymbosely branched upwards only, 2–3 ft. high, erect round firm fistulose striated, about as thick as the little finger, hard and very tough, cottony upwards, leafy throughout, dividing upwards into mostly 3 or

4–6 or 7 simple leafy 1-fld. branches rising candelabra-like to nearly the same level. L. large ample dark or full shining gr. above, snowy cottony and powdery beneath, the lower 12 or 15 in. long and 5 or 6 broad attenuated downwards into a fleshy winged broad flattened petiole, those of the st. broadly cordato-auriculate and half amplexicaul but not decurrent, the lower with regularly and equably doubly sinuato-crenate margins fringed with soft forward-pointing short spinescent setules, the upper entire. Fl. pale bright purple not unlike those of *Centaurea Scabiosa* L., the heads 1–1½ in. in diam. depressedly globose in bud, very hard and shining or naked with compactly imbricate more or less dark v. or purple obsoletely 1-nerved scales with entire floccosely woolly edges and a minute apical soft mucro. Fl. all perfect not radiant. Anthers linear with very narrow acuminate basal teeth, filam. glanduloso-pubescent. Tube of flts. long and slender swollen upwards; limb in 5 deep narrow linear stellate segm. about half the length of the upper swollen part of the tube. Style exserted long simple slender cylindric smooth, lilac upwards. Recept. not fleshy densely chaffy-setose with long silky w. soft flattened hairs. Pappus silky w. plumose in all the seeds. Ach. large compressed smooth even.

The roots of this pl. might possibly become by cultivation useful as an esculent, and would prove serviceable even in the wild pl. in times of scarcity. But they are wholly unnoticed and neglected by the country-people.

It is remarkable that, although two fair Mad. spec. from Masson (1777) of this fine and abundant pl. have long existed in the BH., it is entirely omitted in Von Buch's and all other lists of Mad. sp. It does not occur in either the Canaries or Açores.

34. CARDUUS L.

†1. C. TENUIFLORUS Curt.

Feebly but copiously armed or spinellous, st. and branches broadly and spinellously sinuate-winged throughout; l. decurrent broadly sinuato-pinnatifid, spinellously toothed, pubescent, dull hoary or greyish gr., cobwebby-whitish beneath, sometimes milky-veined above; heads caducous cylindric-oblong small few-fld. sessile aggregate several or mostly more than 2 or 3 together in small close terminal tufts or cymes at the ends of the branches intermixed with spinellous leafy br. shorter than themselves; scales loosely imbricate erecto-patent nearly smooth pale gr. or v.-purple with very narrow scarious edges, gradually acuminate into a finely subulate weak not

pungent erecto-patent spine, the inner finely acuminate not spinous as long as or longer than the flts.; coloured limb of cor. as long as the tube; hairs of pappus equal or simple not clavate.—Curt. Fl. Lond. vi. t. 55; EB. 412; Pers. ii. 385; Hook. Fl. Sc. i. 236; Sm. E. Fl. iii. 385; Spr. Syst. iii. 385; DC. vi. 626 (var. α); Koch 459; Seub. Fl. Az. 33; Coss. et Germ. ii. 386; Bab. 188; Gren. et Godr. ii. 226; RFG. xv. t. 134. f. i.; Willk. et Lange Fl. Hisp. ii. 195. *C. pycnocephalus* Buch! 194. no. 247; WB. ii. 377 (excl. plerisque syn.); Benth. Handb. i. 463, f. 553 (not Linn.).—Herb. ann. Mad. and PS. reg. 1, 2, 3, ccc: not seen in any of the Desertas. Roadsides, borders of cornfields and waste ground everywhere especially below 2000 ft., yet also very near the highest summit of Pico Grande above 5000 ft. mostly growing gregariously in beds. March–Aug.—A low branched leafy but neither conspicuous nor strongly armed thistle, with small cylindric fl.-heads. Foliage dull leaden greyish rather large and copious especially at the base of the st. which is rarely more than 1 or 2 ft. high branched and broadly spinous-winged quite up to the top. L. broad in proportion to their length, the lower about 6 in. long, 3 in. broad, the lobes as broad as deep spinellously toothed, spines all fine slender weak and feebly pungent. Heads about $\frac{1}{2}$ in. long and $\frac{1}{4}$ in. broad, smooth or very slightly cobwebby, their scales spiniform but not pungent. Flts. 10–20 varying from pale pink or rose to purple rarely w. Scales of inv. slightly cobwebby at the base but without any golden glands or dots. Ach. oblong compressed $3\frac{1}{2}$–4 mill. long, $1\frac{1}{2}$–$1\frac{3}{4}$ broad, smooth shining viscous, pale yellowish-drab or fulvous, finely lineolate longitudinally with dusky lines, not ribbed or striate. Margin of epig. disk prominent entire. Pappus 3 times the length of ach.

2. C. SQUARROSUS (DC.).

Unarmed, shortly and feebly spinellous; st. and branches narrowly spinellously subsinuately winged throughout and cobwebby; l. decurrent undivided narrow-oblong shallowly duplicato-serrate and thinly and shortly ciliato-spinellous, hoary-tomentose beneath, above furfuraceo-pustulate or flocculoso-glabrescent; heads sessile agglomerate in terminal 1–2-bracteate tufts or masses, campanulate or semiovate, smooth or naked; scales unarmed, the outer squarrosely recurved broadly scarious ovate or ovate-oblong strongly ribbed acute and mucronate or acuminate, the inner erect straight ligulate or linear with scarious acute tips, longer than the flts., the limb of which is equal to the tube; hairs of pappus partly clavulate.—Novit. 540 or 18. *Clavena squarrosa* DC. vi. 633.—Herb. ann. Mad. reg. 3 (occasionally 1), rr. Moist rocks or shady banks in ravines, e. g. Rib. de S^{ta} Luzia, Rib. da Metade, Serra d'Agua,

under Pico Grande, Rib. do Inferno below the Lombo dos Pecegueiros, sea-cliff road between Seixal and S. Vicente, at the Passo d'Area, &c., everywhere sparingly. May–Aug.—A fine pl. of its tribe, rising when luxuriant to the height of 3 or 4 ft., erectly paniculately branched upwards and bearing at top a profusion of sessile fl.-heads agglomerate in large w. masses; but occasionally dwindling down from this size to a height of 6 in., with a single terminal tuft of 2 or 3 heads. L. dark full gr. above, hoary or white like the st. beneath, the lower 6–12 in. long, 2 or 3 broad, with shallow regular or equal serratures and sparingly and inconspicuously spinuloso-ciliate edges. Heads perfectly sessile in terminal tufts 1½–2 in. in diam., each ½–¾ in. long and 4–6 lines broad, shining pale gr. or greenish straw-colour, the scales strongly squarrosely reflexed, quite smooth, gr. with broad pale ochraceous scarious tips and margins. Flts. pure w., shorter than the inner involucral scales, their limb as long as or a little shorter than the tube. Pappus very deciduous and copious covering the whole pl. and combining the heads into dense snowy masses; some of its hairs clavate. Ach. obovate, truncate at top, compressed obsoletely subquadrangular, 3 millim. long, 1¼–1½ broad, smooth and shining but through the lens very obsoletely subrugulosely striolate or punctate longitudinally, pale brown or cinereous mottled or speckled with darker brown or black.

The unarmed undivided merely ciliato-serrate l., and always pure-w. fl. immediately distinguish this from the closely allied Canarian *C. clavulatus* Link WB. ii. 375, t. 113 (*Clavena canariensis* DC. vi. 633), and from *C. bæocephalus* Webb WB. ii. 373, t. 112. It is further distinguished from the former by the squarrosely reflexed involucral scales, and from the latter by the much larger heads and altogether greater size and stature.

The specimens described by DC. l. c. "ex horto Barclayano" originated from seeds collected by me in Mad. and sent in 1828 to the Rev. M. J. Berkeley.

Tribe XIX. *Centaurieæ* DC.

35. Centaurea L.

§ 1. *Cheirolophus* Cass. Heads ovato-globose *unarmed*; scales membranaceo-marginate entire, apical appendage *unarmed membranous* not decurrent, semiorbicular or lunate and *pectinately lacerate or fimbriately ciliato-palmate.* Pappus setose caducous. Hilum naked not bearded.—

Shr. with entire or pinnatipartite l., erect branches and solitary terminal purple fl.

1. C. Massoniana Lowe.

Proliferously branched erect bushy, branches woody and naked below, thickly leafy and snowy-tomentose at their ends; l. all simple lanceolate acuminate at both ends, attenuated into and decurrent all down the petiole, very entire minutely furry-puberulous or shortly and finely subtomentose or velvety, the upper subglabrescent; heads large on long stout naked terminal ribbed ped. thickened upwards; scales smooth horny purpurascent with the edge or border brown and the 3–10-palmately fringed apical appendage pale brown or whitish, the cilia or laciniæ flat soft flexuose erect or adpressed subequal and more than half the breadth of the scale long; fl. prominently radiant purple.—Hook. Journ. of Bot. viii. 297; Seem. J. of Bot. iii. 352. *C. salicifolia* Sol. ! MS. in BH.; Buch ! 194. no. 250 (not Bieb.).—Shr. per. Mad. reg. 1, 2, "PS. reg. 4," rrr. Perpendicular sea face of the high cliffs between Pico do Rancho and Cabo Girão; and "on high ledges and steeps above the path leading from the Allegria above S. Roque to the W. brink of the Rib. de S^{ta} Luzia," F. M. Norman, Esq., R.N.; "Pico do Concelho in P.S.," Barão do Castello de Paiva (but this last locality needs substantiation). May, June. —A low bushy shr. 1–2 ft. high with rather light gr. foliage confined to the ends of the straight stiff woody thickly knobbed or prominently scarred and longitudinally ribbed or striate naked branches: the young leafy shoots only w. and tomentose. L. minutely pustulate and velvety, crowded at the ends of the branches, 2–3 in. long, 3–6 lines broad, attenuated downwards quite to the base of the petiole which is dilated into a prominent shoulder-like scar or *pulvinus*. Fl. large and handsome (1–1¾ in. in diam.) rising 3–6 in. clear above the l. on stiff erect smooth or glabrescent purplish ped. strongly many-ribbed or striated and thickened upwards. Heads 9–10 lines in diam. ovate-globose or hemispherical, in bud globose. Scales of inv. very compact hard and horny broadly oblong truncate at top with the pale membranous soft lacerato-palmate apical appendage transversely hemispherical or lunate. Florets exserted beyond the inv. 9 or 10 lines, pink- or rose-purple, the segm. linear-acuminate as long as the swollen upper part of the tube or ⅓ of the whole length. Ach. 5–6½ millim. long, 2 or scarcely 2 broad, compressed narrow-oblong, a little attenuated downwards and ending in a short dimidiate laterally incurved tail or cornucopiiform point, truncate at top with a short prominent chimney-like cylindric orange-col. little tube rising in the middle of the naked epigynous disk above the incurved subcontracted margin which is

irregularly bluntly toothed or crenate by the protuberant ends of the ribs, strongly but irregularly and unequally ribbed and striated longitudinally, perfectly smooth and free from all pubescence, shining, cinereous or pale brown, minutely speckled with black. Hilum quite lateral deep and abrupt, not bearded. Pappus setiform fragile of a few brown or mostly purple very deciduous rough short unequal bristles, sometimes dimidiate, sometimes reduced to 2 or 3 or 0. Recept. densely villous or hirsute with long smooth shining flattened bristly hairs.

First found by Masson in 1776, this fine pl. escaped all researches till 1865, when it was rediscovered by a Portuguese gardener, through my directions, in the very spot indicated by its first observer (See Seeman's J. of Bot. iii. 352). It has since been found by Capt. Norman R.N. in one more locality, remote from the sea and at a higher elevation (2500–3000 ft.) above it. The P^to^ S^to^ habitat requires confirmation, resting only on the report of anonymous collectors employed by the Barão do Castello de Paiva.

Though agreeing with *Ptosimopappus* Boiss. in the caducous setiform pappus, this pl. differs from it, no less than from *Centaurea* proper, in the ribbed ach. and incurved irregularly crenate margin of the epigynous disk. Except, however, in the radiant fl. much exceeding the disk (cf. *Plectocephalus* Don), it agrees so perfectly in habit with the other *Centaureæ* of the section *Cheirolophus* that it would be highly undesirable to separate it generically; and it seems rather to supply cogent arguments for the non-separation of *Ptosimopappus* also.

§ 2. *Seridia* DC. Heads ovate-oblong ovate or subglobose *armed spinulous*; apical appendage of scales not decurrent, pungently *palmato-spinulous*. Pappus setose *persistent*. Hilum naked not bearded.—*Herb. per.* Fl. purple.

†2. C. SONCHIFOLIA L.

Subglandular-pubescent scabrous dull gr. or hoary, *roots creeping*; st. *dwarfish* diffusely 2–3-fork-branched upwards, *branches divaricately spreading longer than the main st.*, stiff angular and partially winged; l. dull gr. shortly furry-pubescent, the lower stalked mostly irregularly or partially lyrate, those of the st. and branches auriculate amplexicaul and *semidecurrent*, the upper of nearly equal size narrow lanceolate-oblong sessile *repandly and subequably spinelloso-denticulate*; heads solitary terminal 2–3-leafy-bracteate moderately large

globosely ovate or ovato-conoidal; involucral apical appendages finely but pungently palmato-spinulous, spinules 5–7 subequal palmately divergent subrecurved or spreading pale yellowish or fulvous, each about the length of its own scale; disk of fl. pale or whitish.—Linn.! Sp. 1294; Lam. Enc. i. 672; Pers. ii. 485; DC. vi. 599; Gr. et Godr. ii. 258; RFG. xv. t. 68. f. i.; Willk. et Lange Fl. Hisp. ii. 141. *C. romana* var. Buch! 194. no. 249 (not *C. romana* L. or Desf.); Barr. Ic. t. 236?—Herb. per. Mad. reg. 2, rrr. Completely naturalized amongst cornfields in one spot only of small extent along the Caniço road 3 miles out of Funchal, about the first bridge after passing the Chapel of N. S. das Neves at the bottom of the hollow immediately before arriving at the large tank above the road. May–July.—Roots per. long, scarcely as thick as a goosequill, fleshy w. simple or rarely branched, creeping or running extensively in the light arable soil much like those of the common English Thistle, *Cirsium arvense* (L.). St. 6–12 in. long, somewhat fragile, hard stiff angular, sparingly branched divaricately, diffusely spreading, often procumbent; branches mostly longer than the short erect main st. Whole pl. dull gr., scarcely hoary, subglandular-pubescent, harsh and substrigose, the pubescence short but coarse or furry. Root-l. lyrate, the terminal lobe large oblong, oval or half-oval; middle st.-l. sometimes undivided, more frequently irregularly or partially subsinuately toothed, decurrent halfway down the internodes a little more on one side than the other; the upper always undivided simple equal; the edges of all waved and remotely or repandly mucronato-denticulate or sparingly beset with minute short weak (not pungent) spinules. Fl. dark dull purple, pale or whitish in the middle, from half to about an inch in diam. Heads globose or ovate-oblong, always abruptly rounded at the base, nearly smooth or only a little cottony downwards, shortly and finely but somewhat thickly spinulous, each scale being palmately tipped with 5–7 pale yellowish or fawn-col. rarely purplish spreading pungent subulate spinules of nearly equal length (3–6 millims.) and size, the middle one being scarcely longer or stronger than the rest. Ach. linear-oblong, 5 mill. long, 2 broad, subcompressed and even (not or only obsoletely ribbed or striate) but all over very finely softly and minutely hairy-puberulous, shining pale yellowish grey mottled or streaked longitudinally with olive-brown, crowned at top outside the pappus with a finely toothed rim or border, slightly attenuated downwards and bluntly hooked or dimidiately incurved at the base below the very large conspicuous deeply incised oblique sublateral hilum. Pappus (to all the seeds) a thick tuft or pencil of very short (1–2 mill. long) unequal rough shining or glittering erect w. bristles in many rows. Recept. densely chaffy-villous; chaffs w. shining flattened-setiform.

Spec. of this now supremely rare and local Mad. pl., collected by Masson in 1777, are marked in BH. "Centaurea romana? var. 39," with "potius var. *C. sonchifolia* 37," written above,—the latter certainly, the former probably (as Mr. Bennett thinks) in Solander's handwriting.

§ 3. *Calcitrapa* Koch (*Calcitrapeæ* DC.). Heads ovate or ovate-oblong armed radiato-spinous; apical appendage of scales not decurrent, *pungently pinnato-spinous or produced into a single pungent spine shortly* 2–4 *pectinato-pinnately spinulous on each side at the base.* Ach. with or without pappus; hilum naked not bearded.—Herb. ann. or bien.

(*a*) L. not decurrent; fl. purple. (*Calcitrapa* Cass., DC.)

†3. C. Calcitrapa L. *Cardo de Christo.*

More or less furry or cobwebby-pubescent; st. diffusely and repeatedly fork-branched low bushy straggling pale straw-colour; l. light gr. soft and flaccid, the lower pinnatipartite, middle irregularly sinuato-pinnatilobate, uppermost linear laciniate or undivided, the divisions in all irregularly mucronulato-serrulate; heads leafy-bracteate solitary terminal or lateral and subsessile in or a little above the forks of the st. quite smooth ovoidal strongly armed with rigid very pungent stellately spreading spines; scales stiffly coriaceous dry pale nerveless, contracted at the base of the apical appendage, which is produced into a single large strong spreading or recurved pale spine longer than the heads, channelled above downwards and with 2–4 feeble slender short lateral spines on each side at the base; florets all equal; pappus 0.—Linn. Sp. 1297; Lam. Enc. i. 673; EB. t. 125; Brot. i. 371; Pers. ii. 486; Buch 194. no. 251; Sm. E. Fl. iii. 468; DC. vi. 597; WB. ii. 361; Koch 475; Coss. et Germ. ii. 390; Bab. 187; Gren. et Godr. ii. 261; RFG. xv. t. 67. f. i.; Willk. et Lange Fl. Hisp. ii. 144.—Herb. ann. or bien. Mad. reg. 1, r. Roadside between Funchal and Caniço in several places, especially a little beyond N. S. das Neves; S^ta^ Cruz on the beach. May, June.—A low bushy widely spreading horizontally much branched pl. growing usually in large flat masses 6–12 in. high, remarkable for its light gr. foliage, pale straw-colour or yellowish-w. divaricately forked branches, and the large fiercely pungent pale straw- or fawn-col. spines of the fl.-heads. Root-l. stalked, 6–8 in. long, 2–2½ broad; laciniæ of upper l. long linear. Fl. rather small ½–1 in. in diam. rose-purple. Heads about 6 lines long and 4 broad, their spines 8–12 lines long. "Ach. small obovate smooth shining pale or whitish spotted with brown."

(*b*) L. decurrent; fl. y. (*Mesocentron* DC.)

†4. C. MELITENSIS L. *Beija mão.*

Harshly furry or cobwebby-pubescent substrigose canescent; st. erect or diffuse straight elongate narrow-winged suberectly fork-branched; l. wavy strigosely hoary-pubescent, the radical lyrato-pinnatifid, the st.-l. linear-oblong or linear, irregularly repand-toothed or entire sessile decurrent or partly decurrent, all except the uppermost obtuse; heads rather small leafy-bracteate or naked terminal or lateral solitary or aggregate at the ends of the branches, globose or ovato-globose, naked or slightly cobwebby; scales with a fine sharp slender spreading or recurved terminal spine channelled inside at its base and pectinately pinnate on each side with 2 or 3 lateral remote shorter spinules; fl. equal glandulous; pappus setose dirty w. or fawn-colour.—*C. melitensis* WB. ii. 358; Gren. et Godr. ii. 262; Willk. et Lange ii. 145; J. A. Schm. Fl. Verd. 201. *C. apula* Desf. ii. 300. Varr. or forms:—

a. conferta WB. l. c. 360; Webb Spic. Gorg. 143; J. A. Schm. l. c. Heads geminate or clustered and crowded. *C. melitensis* Linn.! Sp. 1297; Lam. Dict. i. 674. no. 62 (excl. var. *β*); Pers. ii. 486. no. 86; Spr. Syst. iii. 406; Seub. Fl. Az. 32; Coss. et Germ. ii. 391; RFG. xv. t. 65. f. 1. *Jacea melitensis*, &c., Bocc. Sic. 65, t. 35; Moris. Hist. iii. 145. § 7, t. 28. f. 28 (very bad, copied from Boccone). *C. apula* Desf. l. c.; DC. vi. 593. no. 151 (not Lam., Pers.).

β. vulgaris WB. l. c. 360; heads solitary and remote or distinct. *C. apula* Lam. Dict. i. 674. no. 61; Pers. ii. 486. no. 85; Spr. Syst. iii. 407. *C. melitensis* Smith! in Linn. Trans. ii. 238; Fl. Gr. t. 909; DC. vi. 593. no. 150 (not Linn.). *C. lyrata* Pers. ii. 486. no. 94 (ob capitula "solitaria" dicta, incaute a cl. DC. ad *C. apulam* suam citata). *C. solstitialis* Buch! 194. no. 252 (not Linn.). Merely a more developed form or advanced stage of *a.*—Herb. ann. Mad. reg. 1, 2, cc; PS. reg. 2, 3, cc; GD. reg. 2, r or $\frac{r}{2}$; SD. reg. 2, $\frac{r}{2}$. Cornfields, waste rocky ground, sunny banks and walls about Funchal and on the S. coast generally, as in PS. everywhere in chiefly maritime or hot dry situations, and sometimes troublesome from its fine sharp involucral spines. Less common in the north of Mad. March–Sept.—The two forms above indicated run too much together to be properly distinguishable, and are here only recognized for the more clear arrangement of the syn. Still, in Mad., *β* is by far the commonest. Root mostly simple vertical. St. 1–3 ft. high, stragglingly branched from the base, stiff hard slender like the spreading branches. Whole pl. hoary or greyish gr. scabrous glandular-pubescent or subviscoso-furry and here and there cottony or cobwebby. L. flaccid waved, the

radical lyrate, lobes of all but the uppermost obtuse. Heads 3–4 lines in diam. 5 or 6 lines long, scales light gr., their spines brown or dark purple (atropurpureous) and 2–3 lines long, very slender but pungent. Fl. deep lemon-y., protruded in a small pencil-like tuft from the contracted tips of the heads, often abortive. Ach. compressed $\frac{1}{10}$ in. long, shining grey, obsoletely multistriolate and softly hairy-puberulous, dimidiately contracted and incurved into a cornucopiiform pale crook at the base to form the large deeply incised hilum, the pale narrow rim or border at top outside the pappus entire. Pappus about $\frac{1}{3}$ length of ach. in several rows, outer rows very short ovate or ligulate, inner setiform but flattened.

I received some time ago from my ever active friend the Barão do Castello de Paiva spec. of *Centaurea maculosa* Lam. Dict. i. 669; DC. vi. 583; Koch 474; Jord. Obs. v. 61, t. 4. f. D; Gren. et Godr. ii. 254; RFG. xv. t. 48. ff. i., ii.; *C. paniculata* Jacq. Austr. iv. 10, t. 320 (not Linn.), a common S. of Europe sp. with black-tipped pectinato-ciliate unarmed involucral scales (§ *Acrolophus* Cass.), which he supposed he had once met with on landing "somewhere between S^{ta} Cruz and Machico on his way to Caniçal in June or July 1858 or 1859." This now seems however to have been a mistake, arising from some accidental mixture or confusion of spec.

†36. Microlonchus DC.

†1. M. salmanticus (L.).

St. erect widely and remotely divergently fork-branched, branches stiff slender elongate naked ultimately 1-fld.; l. chiefly radical runcinato-pinnatifid in a flat rose or star, withering before inflorescence, upper linear toothed or entire, reduced upwards to mere br., all mucronately toothed or acuminately aristate; heads terminal solitary globosely ovate or conico-lageniform, very hard and compact, quite smooth and naked, unarmed; scales very even smooth punctate finely ciliate, mostly tipped with a minute very short caducous spreading or reflexed setule or spinule.—DC. vi. 563; Webb It. Hisp. 33; Gren. et Godr. ii. 264; RFG. xv. t. 19. *M. Clusii* Spach, Willk. et Lange Fl. Hisp. ii. 168. *Centaurea salmantica* Linn. Sp. 1299; Jacq. Hort. Vindob. t. 64; Lam. Dict. i. 676; Desf. ii. 303; Brot. i. 372; Pers. ii. 488. *Jacea major* &c. Moris. Hist. iii. § 7, t. 26. f. 14.—Herb. per. Mad. reg. 1, r (PS.?, on rocky summit of Pico d'Anna Ferreira, not in fl.). Roadside and dry barren sunny banks in a red clay soil all the way from about a mile on the Funchal side of Caniço nearly to Machico, especially above Caniço and on the Carreira de S^{ta} Catarina

beyond S^ta^ Cruz. (The PS. pl. is not quite certain, having been found in May with root-leaves only.) June–Aug — Pl. 2–4 ft. high growing dispersedly or solitary; sparingly and stragglingly branched with a tall erect main stem and long slender angular stiffly divergent erecto-patent mostly undivided 1-fld. side branches, inconspicuously leafy, naked and quite smooth upwards. Root not creeping simple fleshy large strong long and thick black or blackish. Root-l. lyrate or runcinate (rarely toothed only or entire) 3 or 4 in. long and 1 in. broad, hoary dull gr., subviscid furry-pubescent; the upper smooth, gradually reduced upwards to inconspicuous linear toothed or entire br. St. smooth erect, soon branching into several very long slender straight divergent spreading or straggling smooth 1-fl. ped. clothed with short linear br. a good way up. Fl. buds depresso-spheroidal. Fl. rather handsome and conspicuous on long naked terminal ped., bright gay purple or rose-lilac, about an inch in diam. Scales very closely compressed bright gr. tipped and edged with dark purple and with or without a pale brown very short inconspicuous caducous not pungent spinule at the tip; forming singularly hard neat-looking compact or solid heads about 6–8 lines long and 5 or 6 in diam. Ach. oblong compressed smooth elegantly ribbed longitudinally and punctato-rugulose between the ribs or striæ, dark brown streaked or mottled with pale drab; hilum with a prominent callous ivory-like tumid rim or border. Outer pappus of many short rough simple unequal pale brownish setæ; inner concrete into a ring with one side produced into an erect narrow-acuminate scale as long as or longer than the outer pappus. Recept. densely shaggy with smooth pale brownish w. hairs.

†Tribe XX. *Carthameæ* DC.

†37. KENTROPHYLLUM Neck.

†1. K. LANATUM (L.).

Ann. strongly and sharply spinous glandular-pubescent cobwebby and viscid; st. erect stiff simple virgate subimbricately leafy corymbosely and proliferously branched at top; l. spinoso-pinnatifid, the radical lyrato-pinnatipartite, the st.-l. approximate strongly nerved rigid subcordato-lanceolate amplexicaul acuminately spinoso-cuspidate and pectinately spinous-gashed or toothed; heads rather large solitary terminal proliferously corymbose radiately leafy-spinous; scales cobwebby pale gr. or whitish nerveless coriaceous, the outer with a long gr. leaf-like spreading ensiform pungently acuminato-cuspidate and pectinately ciliato-spinous rigid apical appendage which is reduced in the oblong-lanceolate inner scales to a short cuspidate

discoloured tip; fl. lemon-y.; inner (erecto-connivent) row of pappus only $\frac{1}{3}$ or $\frac{1}{4}$ the length of the outer (spreading) rows.—DC. vi. 610; Koch 468; Coss. et Germ. ii. 393; Gren. et Godr. ii. 265; Willk. et Lange ii. 134. *Carthamus lanatus* Linn. Sp. 1163; Vill. Dauph. iii. 36; Lam. Dict. i. 637; Pers. ii. 380; Buch! 194. no. 242; BM. t. 2142; Fl. Gr. t. 841. *Carduus lanatus* Brot. ii. 342. *Centaurea lanata* Spr. Syst. iii. 408. *Carduncellus lanatus* RFG. xv. t. 15. f. ii. *Carduus luteus* &c. Moris. Hist. iii. 160. § 7, t. 34. f. 2.—Herb. ann. Mad. reg. 1, 2, cc; PS. reg. 2, rr. Roadsides, borders of cornfields and barren sunny places general in the S. of Mad., less frequent in the N. In PS. only in the Serra de Dentro. Not found in the Desertas. May–Aug.—A thistle-like sharply spinous dull-greyish or hoary-gr. more or less cobwebby and clammy rarely subglabrescent pl., giving out whilst young when gently brushed or drawn through the hand a fragrance like that of Fraxinella (*Dictamnus Fraxinella* Pers.). St. 1–2 ft. high pale straw-colour or whitish copiously longitudinally cobwebby from leaf to leaf, shortly proliferously branched at top only, hard stiff straight closely and regularly leafy throughout. Root-l. radiant 4–6 in. long, 1–2 broad, soon disappearing; st.-l. $1\frac{1}{2}$–2 in. long, very regular in size, shape and distance, very hard and stiff erecto-patent semiamplexicaul and subcaudate but not auricled or decurrent at the base. Heads $\frac{1}{2}$–1 in. in diam. ovato-globose pale gr. with a dark brown collar at the much contracted tip beneath the florets, densely cobwebby, formidably armed with the erecto-patent acuminato-cuspidate and spinoso-pectinate stiff leafy gr. apical appendages of the outer scales, which are an inch long, resembling the upper st.-l. into which they gradually blend or pass; inner scales with gradually shorter and simpler similar appendages, and the innermost with merely a brown or atropurpureous tip forming a dark ring or collar at the base of the tuft of florets. Fl. bright lemon-y. but rather small and inconspicuous with few radiant florets contracted into a small tuft or pencil, their tube marked with 5 dark or black prominent fine hair-like lines or veins forked at top and alternate with the segments. Filam. with a tuft of hairs a little below their top. Stigmas concrete. Ach. turbinately tetragonal large short thick subgibbous 2–3 lines long, $1\frac{1}{3}$–2 broad, truncate at top strongly 4-angular and coarsely rugose, the angles prominent and produced at top into 4 or 3 tooth-like shoulders or wings which are pale or whitish, the rest being all deep shining greyish brown or black. The outer or dorsal tooth or shoulder is often obsolete or wanting. Hilum shallow pale whitish round sublateral. Pappus 0 in ach. of outer row; in the rest very large copious and conspicuous of a shining pale drab-brown or fawn-colour with a peculiar silky lustre, 3–4 or $4\frac{1}{2}$ lines long, very unequal, the outer

rows imbricately shorter truncate, the inner longer acuminate, all erecto-patent flat ligulate or linear with the edges very minutely ciliato-serrulate; innermost row very short pale or whitish 2 millim. or $\frac{3}{4}$ line long erect and connivent into a little central cone one line high. Recept. conic densely hirsute with shining pale or whitish linear acuminate flat chaffy hairs a little longer than the ach. which differ much from MM. Grenier and Godron's description of them in their pl.

†38. CARDUNCELLUS Adans.

†1. C. CÆRULEUS (L.).

Unarmed or feebly spinellous slightly cobwebby and more or less furry-pubescent; st. erect or ascending mostly simple 1-fld. leafy; l. shining full gr. often glabrescent stiff and coriaceous strongly nerved mostly undivided sharply and unequally spinuloso-subpinnatifid or inciso-serrate, the lower oblong-oval or elliptic stalked, the upper oblong-lanceolate sessile amplexicaul; heads large solitary globosely ovate or ovoidal bracteated by the stiff gr. foliaceous erecto-patent sharply mucronato-pungent and spinuloso-serrate reticulately nerved apical appendages of the lowest one or two rows of the invol. scales resembling the upper st.-l.; the inner scales pale brown or straw-col. oblong or ligulate hard coriaceous parallelly many-nerved with a rounded-spathulate or lunate dark brown scarious pectinately fringed or lacerately toothed or ciliate apical appendage; fl. blue; erecto-connivent inner row of pappus not less than half the length of the outer rows.—DC. vi. 615; Willk. et Lange ii. 135. *Carthamus cæruleus* Linn. Sp. (ed. 1) 830; Lam. Dict. i. 638; WB. ii. 368. *Carduus cæruleus* Brot. i. 342. *Onobroma cæruleum* Spr. Syst. iii. 392. *Kentrophyllum cæruleum* Gren. et Godr. ii. 264.—Forms or varr.:—

a. dentatus DC. l. c.; l. undivided inciso-serrate. *Carthamus cæruleus* Linn. Sp. (ed. 2) 1163; Desf. ii. 256; Pers. ii. 381. no. 13; BM. t. 2293; Buch! 194. no. 244; WB.! l. c.; Fl. Gr. t. 843. *Carduus Cnici facie* &c. Moris. Hist. iii. § 7, t. 33. f. 18 and t. 34. f. 19.

β. incisus DC. l. c.; lower l. pinnatipartite.—*Carthamus tingitanus* Linn. Sp. (ed. 2) 1163; Desf. ii. 256; Cav. Ic. ii. 24, t. 128; Pers. ii. 381. no. 12. *Carthamus cæruleus β* Lam. l. c.; WB. l. c; Willk. et Lange l. c. *Atractilis cærulea incisis foliis hisp.* Barr. Ic. t. 591.

Herb. per. Mad. reg. 1, 2, r; PS. reg. 2, r. Waste rocky places amongst cornfields and by roadsides at S. Martinho, in the Loo fields near Funchal, Carreira de S^{ta} Catarina between S^{ta} Cruz and Machico &c. in strong red clay soil; P^{to} S^{to} in cornfields towards the Fonte d'Aréa, &c. more general. May-

July.—The two varr. are merely transient forms or states, running into each other, and not worth distinguishing except to make clear the synonymy.—Root or rhizome stout strong hard and woody dark brown or blackish divided into several heads at the crown. St. 1 or several mostly simple straight about 1 ft. high striate or angular hard stiff tough and leafy all the way up, bearing a single handsome middle-sized lavender-b. terminal fl. L. rather stiff and rigid especially the upper, their serratures all tipped with a weak or scarcely pungent spine or mucro, the lower 4 or 5 in. long, 1½ broad, the st.-l. gradually smaller and broadly amplexicaul, not decurrent. Heads ½–1½ in. in diam. mostly furry-pubescent; their lowest one or two rows of scales almost entirely transformed into 10 or 12 bract-like l. resembling the upper st.-l. stiff pungent and anastomosely nerved or veined; the inner parallelly many-nerved with a dark purplish brown or chestnut flexible fimbriate apical appendage. Fil. with a tuft of hairs quite at top, not below it as in *Kentroph. lanatum*. Tube of florets with 5 black hair-like lines, forking at top. Recept. villous.

†††39. Carthamus L.

†††1. C. tinctorius L. **Bastard Saffron.** *Açafróa* or *Açafrão.*

Nearly or quite smooth; l. ovate-lanceolate, the upper and especially the floral spinelloso-ciliate or serrulate, the spinules very short and feeble; heads large corymbose terminal solitary multibracteate with the gr. leaf-like spreading apical appendages of the outer 4–6 rows of scales; ach. large w. irregularly tetragonal.—Linn. Sp. 1162; Lam. Dict. i. 637, Ill. t. 661. f. 3; Brot. i. 345; Pers. ii. 380; Buch 194. no. 241; DC. vi. 612; WB. ii. 364; Koch 467; RFG. xv. t. 15. f. 1.—Herb. ann. Mad. reg. 1, 2, r; PS. reg. 2, r. In or about cottage gardens in Mad. cult., or subspontaneously in waste ground in vineyards about Funchal; in PS. more generally cult. and sometimes seminaturalized in cornfields, as beyond Calhéta &c. April–June. —St. 2–4 ft. high erect straight virgate branched corymbosely upwards only, hard stiff rounded pale straw-col. or whitish. L. dark full gr. shining, nearly or quite smooth like the whole pl., 2–4 in. long, 1½ broad, finely and irregularly but feebly and not pungently spinelloso-serrate. Heads 1–1¼ in. in diam. depresso-globose copiously leafy-bracteate and like cabbage-heads or cabbage-roses, the leafy appendages to the outer scales of the inv. being as large as and perfectly resembling the upper st.-l. into which they blend. Fl. handsome 1 in. in diam. bright more or less deep orange-col., the tube of the florets with 5 black hair-like lines forking at top. Ach. 4 lines long, 2–2½ broad, smooth shining subgibbous with the dorsal angle

sharper and more prominent than the rest; all without trace of pappus. Recept. densely villous.

The dried florets are used for colouring or flavouring soups and other dishes. The seeds or ach. are said to be a favourite food of Parrots or Parakeets.

§ 2. *Anthers caudate or awned at the base.*

Tribe XXI. *Carlineæ* Cass. (partly).

40. CARLINA Tournef.

Sect. 1. *Eucarlina* Gr. et Godr. Inner scales of inv. radiant.

1. C. SALICIFOLIA (L. fil.).

Shr.; l. linear-lanceolate or lanceolate coriaceous flat with partially or narrowly and faintly revolute edges, densely and closely snowy-tomentose beneath, glabrescent smooth and shining above, finely and more or less regularly setaceo-ciliate or spinelloso-serrulate especially downwards and at their junction with the st., rarely unarmed and entire: br. or apical appendages of outer involl. scales leafy spreading ciliato-spinellous, mostly longer than the shortly radiant recurved scarious dark-col. inner; fl. terminal solitary subcorymbose or scattered.—WB. ii. 344. *Carthamus integrifolius* Sol.! in BH.; Buch! 194. no. 243.—Varr. or forms:—

α. *spinellosa*; l. and fl. bracts or appendages more or less copiously and conspicuously setaceo-ciliate or spinelloso-serrulate linear-lanceolate acuminato-cuspidate.—*Carlina salicifolia* DC. vi. 548; WB. l. c. t. 115. *Carlowizia salicifolia* "Much. Meth. 225;" DC. (Recueil de Mém. 1813) Diss. v. Obs. sur les Compos. ii. 52, t. 11; Jacq. fil. Eclog. i. 12, t. 5; Spr. Syst. iii. 379. *Carthamus salicifolius* Pers. ii. 381. *Carthamus integrifolius* β and γ Sol.! in BH.

Subv. 1. Heads corymbose numerous.—*Carlina salicifolia* β *corymbosa* DC. l. c.

Subv. 2. Heads few scattered. WB. l. c. t. 115.

Shr. per. Mad. reg. 3 and upper part of 2, cc. In all the principal ravines on high perpendicular rocks or cliffs everywhere. June–Aug.—A straggling shr. 2–4 ft. high subproliferously or corymbosely branched with long spreading ascending or subpendent stiff woody somewhat brittle flaunting straggling crooked or subtortuous branches, naked below, leafy and snowy tomentose towards the ends. L. snowy-w. beneath, dark shining gr. above, crowded or tufted towards the ends of

the branches, the old ones long-persistent in decay beneath the new, 2–3 or 4 in. long and ¼–½ broad but extremely variable in breadth and in regularity of the ciliate serratures, attenuate at both ends, sessile or amplexicaul and copiously setoso-ciliate or fringed at their junction with the st. Heads discoidal or inconspicuously radiant hemispherical, 1 in. in diam., but when corymbose often smaller (¾ in.), sometimes scattered singly or dispersed and few, sometimes corymbosely grouped together. Fl. dull yellowish w. or straw-col. Outer leafy br. or apical appendages resembling the upper l. and very variable in size and proportionate length, but mostly quite overtopping the heads and finely acuminate. Inner scales of inv. linear-ligulate radiant recurved dark discoloured steely-blackish coffee-brown or atropurpureous upwards, more or less produced into finely acuminate paler points. Ach. small brown oblong obconic, 3 millims. long, 1 broad, thickly and erecto-adpressedly shining-hirsute. Pappus pale brown. Setaceous chaffs of recept. pale brown nearly as long as the florets persistent and forming a flat dense cushion-like disk, linear-oblong, deep-cleft into many parallel linear straight segments which are often tipped with red.

The two subvarr. pass into each other by innumerable intermediate forms.

β. inermis; like *α*, but with the l. and fl. br. or appendages quite entire and without or nearly without marginal setaceous cilia except a few sometimes quite at the base.—*Carthamus salicifolius* Linn. fil. "Suppl. 350;" Lam. Dict. i. 640. *C. integrifolius α*, Sol.! in BH.—Mad. reg. 2, rrr. Only on the Pico do Rancho beyond Camera de Lobos. June.—L. 2–3 in. long, ¼–½ in. broad. Scarcely worth distinguishing except for the clear adjustment of the synonyms.

γ. latifolia; l. and fl. br. quite entire and without setaceous cilia except a few on each side at the base, shortly lanceolate or subspathulately oblongo-lanceolate simply acute and cuspidate or subobtuse and mucronate.—PS. reg. 1, rr; SD. reg. 2, rr. In PS. near the edge of the sea-cliff above the Fonte d'Aréa, at P^to dos Frades, and on rocks at the mouth of the Serra de Dentro; in SD. at the top of the island: in the two former cases in or near fossiliferous sand-deposits. May–July. —A lower stouter more dwarfish bushy and upright shr. than *α*, with Phillyrea-like l. 1–2 in. long, ¼–½ in. broad, dark bright shining gr. above and snowy-tomentose beneath. The heads are smaller and their br. or apical appendages not finely acuminate but broader shorter more conspicuous and numerous than in *α* though not perhaps more so than in *β*, giving the heads somewhat of a rose-like appearance. From these

striking differences of aspect and habit, I have been often tempted to consider it distinct specifically: but never having seen it with the fl. quite developed, and considering especially the extreme variability of *α* and *β* in almost every character of foliage and inflorescence, I cannot find sufficient warrant for distinguishing it more than varietally.

41. Lappa Tournef.

(*Arctium* Linn., Vill., Willd.)

Burdock.

1. L. minor (Schk.) DC. *Teijeira, Tinjeira, Bardana* or *Murruca.*

Light gr. slightly viscoso-pubescent; l. stalked broadly oval or oblong softly repando-mucronulato-denticulate obtuse, the lower suborbicular cordate, upper cuneate at the base; heads stalked in terminal and axillary *oblong rac., scarcely cobwebby*; scales of inv. all erecto-patent linear-acuminate, triquetro-subulate hooked and *purple at the tip*, subserrulate or slightly glanduloso-ciliate only at the base, the inner *as long as* and otherwise resembling the outer, not radiant, *all shorter than the fl.*; ach. slightly rugulose transversely at the base, border of epigynous disk *even.*—*Arctium minus* "Schk. Handb. 3. t. 227;" Bab. 171. *Lappa minor* DC. vi. 661; Koch 463; Gren. et Godr. ii. 280; RFG. xv. t. 80. f. i.; Willk. et Lange ii. 176. *Lappa glabra α* Lam. Dict. i. 377. *Lappa communis* var. *α minor* Coss. et Germ. ii. 389. *Arctium Lappa* Curt. Fl. Lond. iv. t. 238; EB. t. 1228 (excl. section of head at lower left-hand corner); Buch 194. no. 245 (not Linn.).—Herb. bien. Mad., reg. 3 and upper part of 2, $\frac{c}{g}$. Dry wooded ravines or shady places; Rib. Frio, da Metade, de S. Jorge, de S. Vicente, da Janella, da Seixal, da Serra d'Agua, de Machico, at S. Antº da Serra about the church, above Pteº da Cruz &c. July–Sept.—A large tall pl. with ample foliage, but altogether smaller and less coarse or cumbrous than the common English Burdock (*L. major* (Schk.) = *Arctium Lappa α* Linn.) and with comparatively conspicuous gay bright purple fl. St. erect not widely branched strong hard stiff and tough ribbed or striate mostly purplish 2–4 ft. high. L. 4–10 or 12 in. long or broad, smooth and light or fresh gr. above, paler and subpubescent but scarcely cottony beneath, the lower 3-ribbed and cordate or cut away on each side to the 2 side ribs as in *Scrophularia Scorodonia* L. Heads $\frac{1}{2}$–$\frac{3}{4}$ in. in diam. stalked subremote as it were in leafy oblong rac. dull purple about the size of hazel-nuts very slightly and sparingly arachnoidal, slightly viscous, not excessively prehensile. Florets conspicuous bright rose-purple, the

stigmas and anthers exserted beyond the subulate hooked scales, w. or tinged with very pale bluish purple and contrasting brightly with the florets. Scales of inv. flattened and gr. below, triquetro-subulate and dull purple towards the hooked brown tip, all equally erecto-patent (not radiant) and the innermost hooked or prehensile like the outer. Ach. 5–6 mill. long, 2–3 broad, oblong or cuneate-oblong dark brown speckled with black, much compressed many-ribbed, a little rugose at the base. Pappus pale brown or tawny short bristly rough not half the length of ach.

The whole pl. is somewhat viscous but scentless and only slightly bitter. A decoction of it is used for cutaneous complaints in lieu of Sarsaparilla.

Table of Genera.

SUBORDER III. LIGULIFLORÆ DC. (CICHORACEÆ Vaill., Juss. &c.)

Tribe XXII. SCOLYMEÆ.

42. *Scolymus.*

Tribe XXIII. HYOSERIDEÆ.

43. *Cichorium.*
44. *Tolpis.*
45. *Hedypnois.*

Tribe XXIV. LAMPSANEÆ.

46. *Lampsana.*

Tribe XXV. LEONTODONTEÆ.

47. *Thrincia.*
48. *Helminthia.*
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Tribe XXVI. SCORZONEREÆ.

50. *Geropogon.*

Tribe XXVII. HYPOCHŒRIDEÆ.

51. *Hypochœris.*

Tribe XXVIII. CHONDRILLEÆ.

52. *Taraxacum.*

Tribe XXIX. LACTUCEÆ.

53. *Lactuca.*
54. *Sonchus.*

Tribe XXX. CREPIDEÆ.

55. *Crepis.*
56. *Andryala.*

Suborder III. LIGULIFLORÆ DC. (Cichoraceæ Vaill., Juss. &c.)

†Tribe XXII. *Scolymeæ* Less.

†42. Scolymus L.

†1. S. maculatus L. *Tigarro*, P^to S^to.

Ann. nearly or quite smooth rigidly and strongly spinous; st. erect straight shortly and almost horizontally branched at top, broadly 3–5-spinous-winged throughout; the wings triangularly spinous-toothed; l. oblong deltoidally or triangularly sinuate-lobed or pinnatifid strongly and copiously spinous-toothed and serrate with a thickened cartilaginous pale border and strong cartilaginous w. nerves and spines, very stiff and coriaceous, milky-veined and mottled, the st.-l. broadly decurrent; heads small terminal aggregate in twos or threes or solitary at the ends of the branches, nearly or quite sessile and closely involucrate with mostly 5 large leafy coriaceo-rigid pectinately spinous erecto-connivent br. with a thickened cartilaginous pale border like the l.; scales of inv. all membranous simple lanceolate feebly cuspidate unarmed entire; fl. deep golden or orange-y., tube of the florets clothed with fine black woolly hairs, anthers purplish-brown; ach. broadly winged and dimidiately crowned at top by their close-adhering membranous or chaffy coat; pappus 0.—Linn. Sp. 1143; Desf. ii. 242; Brot. i. 335; Lam. Dict. vii. 12, Ill. t. 659. f. 2; Pers. ii. 380; DC. vii. 75; WB. ii. 387; Koch 477; Fl. Gr. t. 824; Gren. et Godr. ii. 390; RFG. xix. t. 2. f. i.; Willk. et Lange ii. 203. *S. hispanicus* Buch! 194. no. 240; DC.! l. c. 76 and Willk. et Lange l. c. 204 quoad pl. Mad. (not Linn.).—Herb. ann. Mad. reg. 1, r/2; PS. reg. 2, rr. Loo fields and towards the Praia abundant as elsewhere here and there along the S. coast, on P^ta de S. Lourenço, &c.; in PS. in cornfields and sunny barren places more rare, and small or dwarfish; N. ascent of Pico Debaixo, Serra or Rib. de Fora, &c. May–July.—A striking somewhat handsome thistle-like pl. with its milky-veined or marbled rigid harshly prickly foliage and leafy-bracteate but not conspicuous y. fl. St. hard stiffly erect w. or pale straw-col. broadly and equably spinous-winged uninterruptedly from top to bottom, mostly subpubescent downwards, 1–3 ft. high, rarely branched except at top, the branches short and spreading. Stripped of its wings the st. is peculiarly round and even. L. 4 or 5 in. long, 1 or 2 broad, remarkably rigid and stiffly and strongly spinous, the lobes or divisions deltoidal; light or yellowish gr. varied with milky nerves and sometimes diffuse spots or blotches, with their decurrent wings the same. Heads 1/2 in. in diam. globosely ovate sessile and embosomed in their

leaf-like br. Scales of inv. membranous feebly spinescent or cuspidate gr. with pale or whitish margins. Fl. not conspicuous with few small florets contracted into a tuft or pencil, all narrowly and shortly ligulate with their tube clothed upwards for the greater part of its length with dark brown or black fine short woolly hairs. Ach. with its coat small obcompressed or flattened, scale-like or resembling a pod or silicle of *Lepidium* or *Thlaspi*, oblong or obovate-oblong rounded or subtruncate at top, 5 millim. long, 3–3½ broad, close-packed in a compact shortly conoidal mass, the inner only deciduous, the outer persistent and concrete on the alveolate shortly pyramidal obtuse recept. by their chaffy coat or pseudo-pericarp; stripped of this they are pale grey, smooth and even, narrow-pearshaped obcompressedly flattened subtriquetrous dorsally convex, their ventral face broad and flat, coated and broadly winged all round and at top with the closely adhering w. or pale straw-col. pericarp-like chaff completely enclosing it except a small V-like opening on the shining inner face at top, in which appears its scar-like apex or epigynous disk. Pappus 0 except a minute entire rim or border round the exposed knob-like epig. disk.

Brotero's description of this pl. is most full and accurate, especially as to the ach. or fr.

Sc. hispanicus L. is common in Tenerife, especially between Sta Cruz and Laguna, but it has not occurred in Mad., though by some mistake DC. has referred on my authority to it instead of to *S. maculatus*, the only Mad. *Scolymus* ever found in Mad. (See Proceed. Linn. Soc. v. no. 17, p. 40.) It is at once distinguished by its much less strongly or hard-spined and nerved l., larger orange or darker y. fl. sessile or on short axillary side branchlets all the way up the often very tall (3–6 ft.) mostly simple virgate not corymbosely branched st., shortly membranacco-coroniform 2-setose pappus, &c.

Scolymus is certainly allied by its pseudopericarpiate ach. to *Xanthium*, but not more than *Lappa* is by habit, and, indeed, allied by its ach. but a degree or two more than *Xerotium*, *Micropus* &c., or even *Hedypnois*, *Hyoseris*, *Rhagadiolus*, *Thrincia* &c. The former relation however explains perhaps its being placed by Grenier and Godron at the end of *Compositaceæ* immediately before *Xanthium*. But *Lappa* has equal and perhaps better claims to be so placed. And certainly in point of habit *Scolymus* ought not to be far separated from *Carlina*, *Carthamus* &c., and comes in very badly between *Crepideæ* (*Crepis*, *Hieracium*, *Andryala* &c.) and *Ambrosiaceæ* (*Xanthium*, *Ambrosia*).

Tribe XXIII. *Hyoserideæ* Gren.

†43. Cichorium L.

Succory, Endive.

†1. C. DIVARICATUM Schousb. *Almeirão, Almeirante* or *Almirante*, PS.

Furry-glabrescent subaphyllous; st. mostly slanting often flexuous very widely divaricately branched from the base, branches horizontally straggling or deflexed stiff naked even or very obsoletely striate; root-l. runcinate or lyrato-runcinate and finely sinuato-denticulate, stem-l. inconspicuous small bract-like shortly cordate-acuminate sessile or semiamplexicaul entire or toothed only at the base; fl. axillary partly sessile partly stalked on long wide-spreading straight or decurvato-ascending branch-like fistulose subclavate stalks or ped., often geminate, one sessile, one stalked; scales of outer inv. broadly oblong or oval obtuse mucronate, of inner linear-ligulate subobtuse, all simply setoso- or piloso-ciliate not glanduliferous; "pappus-crown of numerous distinct chaffs $\frac{1}{3}$ the length of the plain or even (not transversely lineolate) ach."—"Schousb. Maroc. 197; Willd. iii. 1609; Guss. Sic. ii. 427;" Poir. Suppl. ii. 229; Pers. ii. 379; Gren. et Godr. ii. 237; Willk. et Lange ii. 205; RFG. xix. t. 6. f. iii. *C. Intybus* Buch! 194. no. 239 (not Linn.). *C. Intybus* β *divaricatum* DC. vii. 84. *C. Endivia* b. *divaricata* WB. ii. 391.—Herb. ann. Mad. reg. 1, 2, c; PS. reg. 1, 2, ccc; not seen in the Desertas. Borders of cornfields and vineyards, waste ground, and roadsides general, about Funchal both E. and W., at the Mount, &c.; on P^{ta} de S. Lourenço about the Piedade, &c., and everywhere in PS. March–Sept.—Whole pl. varying from smooth to more or less hairy but mostly smooth and shining, dark or full gr. Root long simple tap-shaped tapering pale or whitish. St. 6–18 in. long, rising often obliquely from the crown, rarely erect often flexuous, excessively rigid hard and stiffly straggligly-branched, mostly purplish and smooth but sometimes somewhat hairy, always round and even, appearing much more branched than it really is from the long branch-like ped. of many of the fl., and leafless from the small size of the l. which are reduced upwards to mere cordate-acuminate amplexicaul or sheathing purpurascent bracts with a w. or pale brown mark or scar at their base. Root-l. in a small loose evanescent tuft, 3–6 in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad, mostly smooth or furry-pubescent beneath only on the nerves and midrib, shining full gr. flaccid soon withering and quickly disappearing altogether as the fl. advance. Fl. handsome, bright pale lavender-blue about an inch in diam., clustered in the axils of the forks and st.-l., ag-

glomerate or crowded in very short abbreviated suppressed or condensed racemose or spicate cymes or clusters of 2–6 fl. (mostly 2 or 3), the upper 1–5 axillary sessile, the lower 1–5 terminal on long thick round straight or curved branch-like stiff ped. or 1-fld. branchlets 2–4 in. long fistulose and swollen upwards, often in twos or threes only, one or two sessile and one or two stalked, but normally with more both stalked and sessile. The thick fistulose stalks or ped. look like abortive 1-fld. branches, but are really for the most part the lateral fl.-stalks of a condensed abbreviate proliferously flowering corymbose cyme, of which the primary or central fl. are nearly or quite sessile, overtopped by but opening before the secondary long-stalked lower lateral fl.,—much as in *Tolpis*. Their terminal fl. is uniformly ebracteate—this, in conjunction with their being fistulose and swollen upwards, proving them to be mostly rather ped. than as they have been termed "branches." Scales of outer inv. purpurascent smooth fringed or ciliate distinctly and sometimes hirsute with w. simple not glandular-tipped hairs, with a pale scar-like thickened, indurated spathulate or oblong middle portion at their base half the length of the scale itself and appearing like a close-pressed outer scale or br. Scales of inner inv. gr. herbaceous, less distinctly or regularly ciliate with short simple hairs or setules. The ripe ach. I have not been able to examine; but they are described and figured by Reichenbach in RFG. l. c. as differing from those of *C. Intybus* L. in not being transversely lineolate but plain and even ("non exsculpta"), and in having a much longer coronule of chaffs about $\frac{1}{3}$ the length of the ach. instead of $\frac{1}{7}$ or $\frac{1}{8}$, i. e. more than twice as long. In *C. Endivia* L. the chaffs, according to the same author, are of much the same proportionate length as in *C. divaricatum*; but in both *C. Endivia* and *C. Intybus* they are said to be sometimes united downwards, not distinct to the base.

C. pumilum Jacq. Obs. iv. 3. t. 80, and Fl. Gr. t. 822, is an erect furry pl. with a different habit and inflorescence, and apparently nearer to *C. Intybus* L. than to the present sp.

44. Tolpis Gärtn.

§ 1. *Eutolpis*. St. herbaceous ann.; root ann. or per.

T. UMBELLATA Bertol.

Ann. light gr. hoary-glaucescent furry-puberulous and thinly subtomentose or mealy; st. few-fld. almost leafless slender erect, sparingly or remotely 2–4 times proliferously 2–3-fork-branched, furry or mealy-puberulous; l. chiefly radical lanceolate-oblong pale dull hoary gr. furry-pubescent sharply and repandly si-

nuate-toothed or subpinnatifid, the upper linear entire; fl. small remote on long proliferously dichotomous or rarely umbellate ped., the central ped. in each dichotomy short fistulose thickened upwards; br. of ped. few and thinly scattered at their top, those of base of inv. more numerous and crowded, all linear-subulate setaceous mealy loosely spreading or ascending, the upper of the calycle equalling the expanded fl. or scarcely longer than the inner close-pressed scales; fl. sulphur or pale lemon-y. with the eye or disk fuller lemon or more golden-y.; pappus of disk with mostly 4 bristles longer than the ach., of the margin all or nearly all reduced to an excessively minute short fringe or crown.—Pers. ii. 377; Spr. Syst. iii. 670; DC. vii. 86. no. 2; Willk. et Lange ii. 206. *T. quatriaristata* Biv. Monogr. Tolp. p. iv, t. 1. *T. crinita* Lowe Prim. 24, t. 2; DC. l. c. no. 3; Seub. Fl. Az. 33. *T. barbata* "forma 1 crinita primaria" WB. ii. 401 (not Linn.!). *Crepis crinita* and *Lapsana stellata* Sol.! MSS. and *Crepis incrassata* Forster! in BH. *C. crenata* (misprint for *crinita*) Buch! 194. no. 223.—Herb. ann. Mad. reg. 2, 3, ccc; PS. reg. 4, rr. Mountain pastures and sunny dry rocky banks and ledges everywhere; above the Mount, up the Cam. do Meio, at Camacha, St. Ant° da Serra, P^to^ da Cruz, S^ta^ Anna, S. Vicente, &c.; in PS. only on the rocky summits of P. do Facho and P. Branco. May–Oct. —Root nearly simple or tap-shaped w. or whitish strong hard or woody but merely ann. St. one or several from the crown, 6 in.–2 ft. long, straight, slender, sometimes numerous, but sparingly branched and few-fld., with a single sessile l. here and there only at the forks, furry-pubescent downwards like the l. and snowy-tomentose at the base, very variable in height and luxuriance, often dwarfed to a single 2–6 fld. st. 2–6 in. high. Root-l. in a small loose tuft, 2–4 in. long, $\frac{1}{2}$–1 in. broad, attenuated downwards. Upper st.-l. inconspicuous linear entire. Ped. of central fl. short and thick, of the lateral elongated slender; all smooth and naked but mealy, thinly and loosely fringed only at top closely below the fl. with a few long linear-setaceous loosely erecto-patent bracts. Fl. 6–8 lines in diam., the outer broader ligules pale dusky-olive outside and sulphur or primrose-colour inside, the inner or disk-flts. dusky or purplish before expansion, but when open only fuller lemon or more golden-y. than the outer, never dark purplish brown. Ach. minute 1 millim. long, dark brown or black, linear-oblong, truncate at top, a little pointed at base, subquadrangular finely ribbed or striated, and very minutely rough or granulate. Pappus of outer row of ach. a single row of excessively short and minute setules; of the rest with from 1 or 2–5 (mostly 4 or 3) of these setules produced into pale straw-coloured rough bristly hairs about twice as long as the ach. and a little

broader but not dilated at the base. The outer ach. are closely embraced dimidiately by the inner scales of inv.

This pl. differs in Mad. constantly from *T. barbata* (L.) in its scanty meagre pale glaucescent mealy far less copious foliage, less robust smaller size and habit, more obovate-oblong or broader and shorter subpinnatifid lower l., shorter and less copious br. of ped., and smaller plain- or one-col. not dark purplish brown-eyed fl. At Mogador up the river, I found the two sorts growing abundantly together, but always, even in the most starved or dwarfish 1-fld. unbranched spec. only 2 in. high, perfectly distinguishable. All the Can. spec. I have seen, whether collected by myself or others (Webb, Bourgeau &c. in HB. and HH.) appear to be the Mad. pl. and not the true *T. barbata* (L.)

2. T. MACRORHIZA (Lowe). *Leituga.*

Per. dark or full shining gr. perfectly smooth; rhizome thick fleshy; st. ann. gr. hard solid slender rigid straight and stiff diffusely erect simple slenderly and shortly corymbosely-branched at top only, thickly leafy throughout; l. fleshy stiff subcoriaceous undivided sharply but subremotely and often obsoletely serrulate or serrate lanceolate, the upper subsessile and sometimes ovate-lanceolate, the lower petiolate, all attenuate or cuneate and quite entire at the base; cyme leafy loosely or widely but stiffly corymbose, mostly few-fld., its branches and ped. slender widely divaricate and subremote mealy, with a few thinly scattered remote erecto-patent linear-setaceous br. upwards; fl. small ($\frac{1}{2}$ in. in diam.) with short and narrow ligules; inv. mealy-puberulous, with several loosely erecto-patent linear-setaceous br. at its base; ach. all setiferous pale brown, pappus about 30-setose tawny.—DC.! vii. 87 (not Wats. in Hook. J. of Bot. ii. 130 and iii. 19 or Seub. Fl. Az. 33. no. 221). *Crepis macrorhiza* Sol.! MSS. in BH.; Buch! 194. no. 227; Hook.! in BM. t. 2988; Lowe Prim. 25. *Schmidtia quercifolia* Reichb. in Höll's List in Fl. Bot. Zeit. 1830, i. 131, 382 (name only, without fig., diagn., or descr.). *Tolpis quercifolia* Schultz in WB. ii. 399.—Herb. per. Mad. reg. 3, cc. Steep shady banks and rocks in all the principal ravines; Rib. de S^{ta} Luzia, da Metade, Rib. Frio, Serra d'Agua, Levada da Rocha furada above P^{to} da Cruz, &c. Quite peculiar to Mad. and not found in either P^{to} S^{to}, the Desertas, the Salvages, the Açores or the Canaries. July–Sept.—Root-stock or rhizome per. subaërial large thick fleshy, penetrating deep into

the clefts or crevices of rocks, mostly divided at top into several short often in old pl. agglomerate branches thickly clothed with dried up l. or their remains, very milky like the whole pl., brown or blackish, rugged scarred or wrinkled, throwing up annually a thick leafy tuft or bush of one or more simple straight erect but mostly somewhat declining or diffuse st. 6–18 in. high and not often thicker than a crowquill, rather pale gr., thin and slender but remarkably hard and stiff, strongly ribbed or angular solid and copiously leafy throughout, sparingly and shortly corymbosely branched at top or upwards, with a sessile l. at each fork or division. L. very smooth and shining, thickish stiff and succulent, rather dark but bright full gr. turning always blackish or dark brown in drying, 2–4 in. long, $\frac{3}{4}$–1 in. broad in the middle, acute at each end, repandly and always simply serrulate or serrate, the teeth always simple and entire, straight, pointing forwards, with sphacelate tips, mostly short and subremote; upper l. sessile or subpetiolate not at all dilated or amplexicaul at the base, the lower or lowest only attenuated into long petioles; all cuneate and entire at the base. Fl. few, rarely numerous, small 6–8 lines in diam. bright golden-y. remote or distinct in a wide-branched leafy panicle, closing quickly after being gathered; their ped. slender and divaricately spreading often horizontally, their br. linear-setaceous few and scattered, those at the base of the inv. more numerous but inconspicuous and much shorter than the inner invol. scales. Anthod. 3–4 lines long, a little swollen at the base in fr. and hoary or mealy especially between the scales like the ped. and br. Ach. pale brown oblong angular faintly ribbed or striated sessile not stipitate. Pappus in all setiform sessile of 20–40 or more yellowish or pale-brown rough bristles. Recept. naked alveolate, edges of its cells membranous jagged or toothed.

A fine and well-marked sp., with small Prenanthes- or Lactuca-like fl. but handsome succulent bright gr. foliage and a peculiar habit. It is strictly confined to Mad.; for the Açorian pl. referred by Watson and by Seubert to *T. macrorhiza* DC. prove on reexamination to be (as Schultz indeed had long before affirmed in WB. ii. 399) varieties or forms with simply toothed or serrate l. of *T. nobilis* Hochst. in Seub. Fl. Az. 33. no. 222, t. xi.=*Crepis Dentax* (sic) Sol.! MS. in BH.

§ 2. *Tolpidodendron.* Shrubby per.

3. T. SUCCULENTA (Ait.). *Visgo.*

Branches slender virgate flaunting or declining woody brittle; l. chiefly in tufts at the base of the fl.-branches more or less succulent sometimes firm or stiff but mostly loose or flac-

cid, variable polymorphous i. e. oblong lanceolate or ligulate, acute or acuminate, either undivided and remotely toothed, or finely pinnatisect with narrow long linear remote laciniæ, or ligulato-coronopiform and pinnatifidly toothed, the number of laciniæ or teeth in all cases mostly 5 or 6 (3–6) on each side; very rarely all simple linear-elongate entire; upper l. of floral branches few and inconspicuous, simple linear nearly or quite entire; cyme remotely few-fld. divaricately forked proliferous, ped. more or less thickened upwards and with their br. and the scales of anthod. mealy-puberulous; br. at top of ped. and base of inv. rather few short erect lax, the latter not above $\frac{1}{3}$ or $\frac{1}{2}$ the length of the inner close-pressed scales; fl. rather large uniform bright golden-y.; pappus of all the ach. of 10 or 12 (10–15) bristly hairs 2–3 times the length of the ach.—*Crepis succulenta*, *C. tenuifolia* and *C. filiformis* Sol.! MSS. in BH; Ait.! Hort. Kew. (ed. 1) iii. 128. *Crepis tenuifolia*, *C. succulenta*, and *C. filiformis* Buch! 194. nos. 229, 230, 231; *Tolpis fruticosa*, *T. pectinata*, and *T. filiformis* DC.! vii. 87; *T. filiformis* and *T. fruticosa* Schultz in WB. ii. 399.—Shr. per. Mad. reg. 1, 2, 3, ccc; PS. reg. 1, 4, r; ND. r, or $\frac{r}{2}$; GD. c; SD. reg. 1, r. Sea-cliffs, rocks and rocky banks everywhere below 3000 ft. in Mad. Apr.–Sept.—A loose straggling or flauntingly and sparingly branched shr. 2 or 3 ft. high, quite smooth except the young branches, ped., br. and anthod. which are slightly mealy-puberulous, or tomentulose. From the short irregular shrubby woody stock or stem spring annually several weak slender diffuse fl.-branches 1–3 ft. long woody chestnut-brown or red or purple downwards, gr. upwards hard round ribbed or striate. L. aggregate in tufts or roses at the base of the fl.-branches, bright shining gr. quite smooth 2–4 in. long, mostly acute, attenuated downwards into a more or less distinct petiole, very variable in form and division; but with mostly very uniformly 5 or 6 remote equidistant teeth or lobes on each side; the upper or floral br. always linear, mostly entire, few and solitary at the forks of the cyme; the latter sparingly and irregularly proliferously fork-branched, compound, almost or quite leafless, not many-fld. Ped. all rather short, especially the primary, bracteate and mealy-tomentulose at top. Heads oblong mealy-tomentose distinctly grey or hoary. Scales or br. of ped. and calycle not numerous, short ovate or linear-lanceolate finely acuminate, linear-subulate in the dried pl., at first close-pressed, afterwards loosely erect at least on the ped. Fl. $\frac{3}{4}$–$1\frac{1}{4}$ or $1\frac{1}{2}$ in. in diam., full golden-y., the outer ligules pale olive dusky at the back; anthers and styles exserted above tube of florets, the stigmas united into a long single dark or dusky olive filament quite up to the bifid top. Recept. convex alveolate naked. Ach. dark chestnut brown or blackish rather larger and smoother than in *T. umbellata*, $1\frac{1}{2}$ millim.

long, distinctly tetragonal ribbed or striate scarcely rough or granulate, oblong, truncate at top, a little pointed at base, all equally setiferous. Pappus in all the ach. of more numerous (10–15) and rather longer pale brown bristly hairs than in *T. umbellata*, the longer hairs being 2–3 times the length of the ach. and intermixed with vastly shorter minute and inconspicuous intermediate setules in the same row at their base.

The protean variations of this pl. in foliage almost defy any definite division, and are often different at different seasons on the selfsame pl. They will be found however to fall tolerably under one or other of the 4 following heads:—

α. multifida; l. flaccid finely laciniato-pinnatipartite or pinnatisect, laciniæ linear-elongate remote entire. — *Crepis succulenta α* Sol.! MSS. *C. succulenta* Buch! l. c. no. 230. *C. tenuifolia* Sol.! MSS. and BH.; Buch! l. c. no. 229 (not Willd., Pers.). *Schmidtia anethifolia* Rchb. in Höll's List l. c. (without diagnosis). *Crepis pectinata* Lowe! Prim. 24. *Tolpis pectinata* DC.! l. c. no. 9. *Tolpis filiformis* b. Schultz in WB. ii. 399. no. 8 (not DC.). *Hieracium fruticosum foliis tenuissime coronopi modo divisis*, Sloane Catal. 123; Hist. Jam. 19, t. 5. ff. 1, 2.—Whole district of Funchal, from the sea-cliffs up to the Arribentão above the Mount, on Pico Grande and elsewhere up to 4000 ft. all along the S. coast from P^ta^ de S. Lourenço to P^ta^ do Pargo, and occasionally also in the N., at Fayal, &c.

Crepis tenuifolia Sol.! and Buch! is merely a finer-leaved autumnal state of Solander's *C. succulenta α* MSS. (not BH.), exactly answering to my *C. pectinata* Prim. l. c.

β. ligulata; l. flaccid pinnatifid or pinnatifidly toothed, laciniæ short tooth-like not linear-elongate, mostly few remote irregular. — *Crepis succulenta β* Sol! MSS. *C. succulenta α* ejusd.! scheda in BH. (not MSS.). *Crepis crithmifolia* Link ex Schultz in WB. l. c. (not *Tolpis crithmifolia* DC. l. c. no. 11). *Tolpis filiformis* a. Schultz in WB. l. c. no. 8 (not DC.).— Camacha, P^to^ da Cruz at and all about the Serrado, Rib. de Fayal on the road to S^ta^ Anna, &c., common in the N. up the ravines or remote from the sea from 500 to 3000 ft. In P^to^ S^to^ on rocky summit of Pico do Facho and on the promontory on the N. coast called "P^ta^ de Guilherme" or "a Malhada."

Solander well distinguishing in his MSS. two varr. of his *C. succulenta*, viz. "*α.* fol. pinnatifidis laciniis linearibus distantibus," and "*β.* fol. linearibus remotis dentatis," has wrongly inscribed "*C. succulenta α.* MSS." on a Mad. spec., "Fr. Masson 1777," clearly belonging to his *β*. In all such cases the MS. or printed

authority must be preferred to that of Herb. spec. of sp., so often (as notedly in the Linn. Herb.) hastily or carelessly misnamed by their own authors.

γ. *linearifolia*; l. all simple undivided linear-elongate nearly or quite entire.—*Crepis filiformis* Sol.! MSS. and BH.; Ait.! Hort. Kew. (ed. 1) iii. 128; Buch! l. c. no. 231. *Tolpis filiformis* DC. l. c. no. 12 (not Schultz in WB.).—Summit of Pico d'Anna Ferreira, PS. One BH. spec. is inscribed "Mad. Fr. Masson 1776;" the other "Hort. Kew." The first of these BH. spec. is a stout robustly shrubby pl. with crowded or fascicled stiffly erect perfectly entire linear l. 2–2½ lines long, 1 mill. broad subobtuse or acute, the lower l. wanting; the second differs only as a garden cult. spec. in being much more slender or attenuate. The PS. spec. have some of the lower l. remotely and sparingly pinnatifid-toothed, and might be perhaps more correctly considered to be fine-leaved forms of β. They are in fact transitional between β and γ.

δ. *oblongifolia*; l. all simple undivided lanceolate or oblong-oval, regularly repand-toothed, often very thick and fleshy.—*Schmidtia fruticosa* Mnch. Suppl. 218; Rchb. in Höll's List l. c. *Hieracium fruticosum* Willd. Sp. iii. 1591; Pers. ii. 375; Poir. Suppl. ii. 564. *Tolpis fruticosa* "Schrank. pl. rar. h. monac. i. t. 46" (DC.); DC. l. c. no. 8; Schultz in WB. l. c. no. 9.—Sea-cliffs and rocks chiefly; Vista da Rocha do Navio at S^ta^ Anna, at P^ta^ Delgada, &c.; top of N. Deserta near the landing place. Very different at first sight in foliage but assuredly a mere maritime form of the sp., nearly confined to the immediate neighbourhood of the sea and passing through β into α by numberless gradations. L. varying from 1–1½ in. long by ½–¾ in. wide and very thick and fleshy to 2 or 3 in. long and ½ in. wide.

The milky juice often forms on the roots of this pl. elastic balls underground, from the size of a pea to that of a walnut, which answer the common cleansing purpose of a piece of india rubber and are sometimes so employed at P^ta^ Delgada and elsewhere in the north. Hence the name "Visgo."

The Can. *T. coronopifolia* (Desf.) is a very distinct ann. sp. with much smaller heads or fl. and widely divaricate ped., not found in Mad. *T. crithmifolia* DC. seems to be some mixture of it with *T. succulenta* α or β. As to *Crepis crithmifolia* Link, I have followed Schultz in WB. ii. 399 in referring it to his *T. filiformis* a, my *T. succulenta* β; though at p. 404 he says that Webb found it at Berlin to be identical with *T. pectinata*, DC., my *T. succulenta* α.

45. Hedypnois Tourn., Willd.

1. H. rhagadioloides (L.) Spr.

St. several from the crown, mostly diffuse branched and leafy or reduced to 1-fld. leafless scapes; l. chiefly or wholly in a radical tuft lanceolate-oblong sinuate-toothed or pinnatifid mostly more or less hispidly pubescent, sometimes smooth; heads drooping in bud, subglobose swollen hard and torulose in fr. with thickened fleshy semicylindric hornlike smooth echinulate or hispid-setose scales; ped. more or less swollen upwards; ach. large 2–3 lines long incurved cylindric slender truncate.—Spr. Syst. iii. 670; Schultz in WB. ii. 396. *H. cretica* Koch 479. *H. polymorpha* Gren. et Godr. ii. 288. *H. monspeliensis, mauritanica, rhagadioloides, cretica* and *pendula* Willd. iii. 1616–1618. *H. cretica, coronopifolia, polymorpha* and *pendula* DC. vii. 81, 82. *H. coronopifolia* and *tubæformis* Ten. *H. tubæformis* and *cretica* RFG. xix. 6, 7, tt. 10, 11. *H. tubæformis, cretica* and *polymorpha* Willk. et Lange ii. 207. *Hyoseris Hedypnois, Rhagadioloides* and *cretica* Linn. Sp. (ed. 2) 1138, 1139. *Hyoseris hedypnois* and *rhagadioloides* Vill. Dauph. iii. 165. *Hyoseris hedypnois* and *cretica* Lam. Dict. iii. 160; Brot. i. 322. *H. cretica* Desf. ii. 232. *Hyoseris monspeliensis, mauritanica, rhagadioloides, cretica* and *pendula* Pers. ii. 369. *Hyoseris mauritanica* and *pendula* Poir. Suppl. iii. 82.—Herb. ann. Mad. reg. 1, cc; PS. reg. 1, 2, cc. Open barren ground, roadsides &c. general near the sea. Valle road, Levada de S^{ta} Luzia, Loo-fields and St. Amaro road about Funchal; P^{ta} de São Lourenço very abundant at the Piedade on the sandy grassy slopes. PS. in cornfields and waste ground everywhere. Not seen in the Desertas. Jan.–June, but almost at all seasons. —Root ann. or bien. pale or whitish somewhat fleshy. From its crown springs a tuft of full gr. l. and several procumbent st. or branches 3–12 in. long, very often reduced to one-fld. scape-like ped. bearing a single l. or none. Whole pl. very variable in pubescence, often nearly or quite smooth especially the upperside of l. Branches sparingly forked with a sessile subentire leaf and 1 or 2 long-stalked fl. from each fork or axil. L. 3 or 4 in. long mostly smooth above, more or less hispid at the edges and beneath, the lower sinuato-pinnatifid with short broad subobtuse subremote lobes or teeth. Ped. 2–4 in. long stiff stout thickened and smooth upwards, subcompressed or angular. Fl. small and inconspicuous $\frac{1}{3}$–$\frac{1}{2}$ in. in diam., bright full lemon or golden-y. with a black eye or point in the middle only so long as any of the central florets remain unopened, closing at noon. Outer involucral scales or bractlets few short membranous deep gr., inner pale thick and fleshy except at the points, all dark at the tips, the inner

or longer tightly enclosing the outer row of ach. and becoming finally in fr. very hard and horn-like with the sides flattened and back rounded. Ligules 5-toothed, in the outer flts. purple at the back; teeth of the inner tipped outside with black forming a black eye or like an insect in the fl. before its complete expansion. Ach. 20–30, linear-cylindric, the marginal sometimes obscurely 4–5-angular, truncate not beaked, longitudinally many-ribbed or striate and finely setuloso-muriculate along the ribs, the 2 or 3 outer rows black shining crowned with a short fringed chaffy cup-like crown; the central or inner abortive, very slender pale brown, crowned with from 1 to 4 or 5 pale rough awnlike or lanceolato-setose chaffs about 2 lines long furnished with a few much shorter simple setæ outside at their base; the outer or marginal row of ach. tightly embraced by and adherent at the base or downwards to the inner or longer involucral scales and thus not deciduous, truncate like the rest, but with a false beak formed by the tip of the enclosing involucral scale. Heads in fr. 4–6 lines in diam., hard torulose or ribbed like a melon or Pitanga.

The following forms have been distinguished by authors; but they run so much together that they are scarcely worth separating, and according to Koch and Sprengel, ll. cc., have proved, when raised from seed, to be entirely inconstant:—

I. *cretica*. St. several branched procumbent or diffuse often reduced to 1-fld. scapes; ped. more or less thickened upwards; longer or inner scales of involucre in fr. crested or shortly muricato-setose dorsally towards the tip, smooth otherwise.—*Hedypnois cretica a. genuina* Bisch., RFG. xix. 6, t. 11. f. i. *H. cretica* DC. l. c. no. 1 (excl. var. β); Koch l. c.; Willk. et Lange l. c. *H. coronopifolia* Ten., DC. l. c. no. 2. *H. polymorpha* β. *diffusa*, form 3, Gren. et Godr. l. c. 289. *H. rhagadioloides* var. ii. Schultz in WB. l. c. *Hyoseris cretica* Linn. l. c. 1139. no. 8; Desf. l. c.; Pers. l. c. no. 16 (not Lam. or Brot.).—This is by far the commonest Mad. form, especially about the Piedade; but it passes into the next sometimes in different heads on the same pl.

II. *monspeliensis*. Like I., but all the scales of involucre altogether smooth or naked.—*Hedypnois cretica* β. *monspeliensis* Bisch., RFG. l. c. ff. ii. 1. *H. monspeliensis* Willd. l. c. *H. polymorpha* DC. l. c. no. 3 (partly). *H. polymorpha* β. *diffusa*, form 1, Gren. et Godr. l. c. 288. *H. polymorpha* α and β Willk. et Lange l. c. *H. rhagadioloides* var. I. Schultz in WB. l. c. *Hyoseris Hedypnois* Linn. 1138. no. 6; Vill. Dauph. l. c. no. 2; Lam. Dict. l. c. no. 6; Brot. l. c. no. 1; Buch 194. no. 237. *H. monspeliensis* Pers. l. c. no. 13. *Intybus sive Endivia lutea verrucaria, capitulum inclinans* Moris. Hist. iii. 53. § 7. t. 1. f. 6.—With the last at the Piedade, P^ta de

S. Lourenço, &c. Roadsides in the Loo-fields beyond Rib. Seco.

III. *chætocephala*. Like I. or II., but scales of inv. all over hispid-setose or pilose.—*Hedypnois cretica* γ. *rhagadioloides* Bisch., RFG. l. c. ff. iii. iv. v. *H. rhagadioloides* Willd. l. c.; var. iii. Schultz in WB. l. c. 397. *H. polymorpha* DC. l. c. no. 3 (partly); β form 2, Gren. et Godr. l. c. 289; γ and δ, Willk. et Lange l. c. 208. *Hyoseris rhagadioloides* Linn. 1139. no. 7; Vill. Dauph. l. c. no. 3; Pers. l. c. no. 15. *H. cretica* Lam. Dict. l. c. no. 7, Ill. t. 654 (*Hyoseris* f. 2); Brot. l. c. no. 2 (not Linn.).—Not hitherto distinctly noticed in Mad., but perhaps overlooked, and very likely to occur.

H. tubæformis Ten. (RFG. l. c. 5, t. 10; Willk. et Lange l. c. 207 = *H. cretica* β DC. l. c. = *H. polymorpha* β, form 4, Gren. et Godr. l. c. 289) seems to be only an abnormal monstrous form of III. with trumpet-shaped ped. thickly clavate or greatly swollen upwards and heads in fr. altogether larger. A perfectly analogous state or monstrosity of forms I. or II. *supra*, with smooth inv. scales, occurs occasionally in Mad., near the sea about the "Crater" in the Loo-fields between the Gorgulho and E. end of the Praia, which is perhaps more precisely than Tenore's pl. DC.'s *H. cretica* β. *subacaulis*.

Gren. and Godr.'s *H. polymorpha* var. α *erecta*, with erect st. = *H. mauritiana* and *pendula* Willd. l. c. = *H. pendula* DC. l. c. 82 = *Hyoseris mauritiana* and *pendula* Pers. l. c. and Poir. Suppl. iii. 82 has not occurred in Mad.

†Tribe XXIV. *Lampsaneæ* Less.

†46. Lampsana Tourn.

†1. L. communis (L.).

Mostly smooth or glabrescent; heads small, scales of inv. quite smooth, the inner as long as the flts., outer (of calycle) short.—(*Lapsana*) Linn. Sp. 1141; Brot. i. 312; Pers. ii. 378 (misprinted 348); EB. t. 844; Hook. Fl. Sc. i. 234; Sm. E. Fl. iii. 377; Koch 477; Coss. et Germ. ii. 426; Bab. 191; Willk. et Lange ii. 212; RFG. xix. 2, t. 2. ff. iii. iv. *Lampsana communis* Lam. Dict. iii. 414; DC. vii. 76; WB. ii. 419; Gren. et Godr. ii. 291.—Herb. ann. Mad. reg. 1, 2, c. Waste ground, roadsides and vineyards about Funchal at the Valle, at Camacha, S. Antonio da Serra in the Cerca, Chestnut woods at S. Vicente, &c. Jan.–June.—St. 1–3 ft. high, erect slender virgate hard stiff leafy and branched all the way up, round smooth striated or pubescent only downwards gr. or sometimes, like the l., v. or purplish. L. of a somewhat dark lurid gr. flaccid thin and membranous, the lower lyrate with the terminal lobe very large and subcordate, the upper simple ovate-acuminate or lanceolate, all angularly toothed and more or less

hispidulous, the upper smooth or glabrescent. Cymes terminal broad loosely and erectly fork-branched, branches and ped. slender round smooth with a narrow-lanceolate or linear l. at each fork. Fl. small 3–5 lines in diam., with about 10 florets, bright lemon-y. Heads cylindric, in fr. angular. Scales of inv. quite smooth carinate dark gr. upwards, those of the calycle 4 or 5 very close-pressed, about $\frac{1}{5}$ or $\frac{1}{6}$ the length of the others which are only 3 lines long, forming in fr. an erect oblong-obovate or slightly barrel-shaped open cup with their tips a little connivent. Ach. very deciduous, 2 lines long, scarcely $\frac{1}{2}$ line broad, slender or narrow, attenuate downwards, broader but contracted and subtruncate quite at top, without any trace of crown or pappus.

A useless but not troublesome weed.

Tribe XXV. *Leontodonteæ* Schultz.

47. THRINCIA Roth.

1. T. HISPIDA Roth. *Leituga.*

Per. or at least bien.; root *tapshaped or fibro-fusiform* simple or branched immediately below the crown, tapering into long strings or fibres, not abruptly truncate or præmorse; l. in a dense radical tuft, thickly hispid remotely sinuato-toothed oblong-lanceolate attenuate and subpinnatifid downwards; scapes 1-fld. slender numerous ascending, hirtose downwards, mostly 2 or 3 times as long as the l.; fl.-buds drooping; all the ach. except the outer row attenuately produced into a slender beak of *about half their whole length.*—"Roth Cat. i. 99;" Brot. i. 327; Spr. iii. 665; Gren. et Godr. ii. 296; RFG. xix. 7, t. 13. f. ii.; Willk. et Lange i. 213. *T. pygmæa* Schultz in WB. ii. 467 (not Pers. ii. 369. no. 5 which=*Hyoseris pygmæa* Ait.! Hort. Kew. ed. 1. iii. 130 which=*Thrincia hirta* Roth). *T. nudicaulis* Lowe! Prim. 28; DC.! vii. 100. no. 6; Seub. Fl. Az. 33, t. xii. f. 1. *Leontodon nudicaule* Sol.! MSS. in BH. partly (i. e. quoad ex. Mad.); Buch! 194. no. 222. *Thrincia maroccana* Pers. l. c. no. 4; DC. l. c. no. 5; Willk. et Lange ii. 214? *T. mauritanica* Spr. l. c. 666. *T. hirta β. hispida* Coss. et Germ. ii. 428.—Herb. per. Mad. reg. 1, 2, 3, ccc; PS. reg. 2, 3, 4, $\frac{r}{2}$; GD. and SD. reg. 2, r. Waste and cult. ground, roadsides, fields, mountain-pastures, &c. everywhere in Mad., chiefly below 2000–3000 ft., not so common in PS. In spring chiefly, but throughout the year. The two following varr. or forms grow intermixed, the first predominating:—

a. chætocephala Lowe; scales of inv. setose-hispid. *T. hispida* Spr. l. c.; RFG. l. c. *T. pygmæa* A, Schultz in WB. l. c. 468 (not Ait., Pers.).—About the Valle, Funchal, Rib. de

S^{ta} Luzia, Curral das Freiras, Arco de Calheta, Camacha, P^{ta} de S. Lourenço, P^{to} da Cruz (Serrado), Rib. da Janella to P^{to} Moniz; PS. on summit of Pico do Concelho.

β. gymnocephala Lowe; scales of inv. naked smooth.—*T pygmæa* B, Schultz in WB. l. c.—With *a*, but less common Curral das Freiras, Arco de Calheta, P^{to} da Cruz (Sitio do Barreiro and Serrado).

Decidedly per. except when starved or killed by drought in scanty soil on arid banks and rocks or sunny mountain pastures. Root pale tough slender stringy hard or woody, in large robust pl. as thick as the tip of the little finger or 2–4 lines in diam. at the top or neck, mostly simple and fusiform or tapshaped, but often dividing shortly below the crown or neck into several branches tapering ultimately into fine fibres, mostly rather short and vertical, but sometimes in light soil or sand produced into a very long slender tortuous or flexuose woody string, running a foot deep or more horizontally or obliquely; in all cases swollen at the crown above ground into a small round hard fleshy flat knob or button (abortive st.) bearing the tuft of l.; the neck below without any set of adventitious roots or radicles (as in EB. t. 555), but occasionally in strong pl. thickly clothed with numerous tufted or matted fine fibres. L. in a thick radical tuft or loose rosette 4–12 in. in diam. and in old robust pl. very numerous; repandly sinuate-toothed subentire upwards, subpinnatifid and much attenuated downwards, oblanceolate, 2–6 in. long, $\frac{1}{2}$–1 in. broad, all more or less densely hispid or furry with short hairs simple or glochidiately bifid at the tip, of a dark dull gr., mostly purplish or red beneath and especially the midrib in decay. Scapes slender, 3–12 or 15 in. long, hard and stiffish, hirtose red or purple downwards, a little swollen at top and before flowering abruptly hooked with pendant fl.-buds. Fl. $\frac{3}{4}$–$1\frac{1}{2}$ in. in diam. full golden-y., the outer ligules with a pale olivaceous drab or sometimes rosy stripe beneath; the segment-tips not glandulose, the tube fringed with long w. hairs on each side at top. Stigmas always y. Heads oblong hispid or smooth; outer scales about 10 (8–12) short linear-acuminate mostly discoloured or reddish purple very close-pressed forming a sort of calycle as in *Senecio*; the inner abruptly longer, fleshy, prominently but obtusely keeled, mostly

gr., red or purple towards the subobtuse scarious tips. Ach. of outer row embraced or enwrapped by the conduplicate inner scales of inv. and about half their length, subcylindric, nearly smooth or even, with short cylindric beaks as thick as themselves, abruptly truncate and crowned with a cup-like coronet of very short pale chaffs. Inner ach. all free slender fusiform dark chestnut-brown elegantly and distinctly echinulato-ribbed, gradually attenuated upwards into fine slender beaks or pappus-stalks as long as or a little longer (rarely in the outer ach. a little shorter) than themselves, the beaks becoming smoother upwards. Pappus pale brown chaffy-setose of about 10 or 12 (8–15) bristles lanceolately dilated at the base, the fine setaceous upper part thinly plumose. Recept. convex alveolate naked, scarcely or very shortly velvety-fibrillose.

Such is the universal everywhere abounding Mad. pl., examined year after year a thousand times and never varying in the least. It differs constantly from *T. hirta* Roth as described by MM. Grenier and Godron in Fl. de Fr. ii. 296 in having nothing about its root answering to "Souche . . . . . *courte, tronquée* et émettant surtout du collet de fortes fibres *filiformes* et *nombreuses*," in its extremely hispid-furry l., and in the beak or pappus-stalk being in all the ach. except the outer row as long as the ach. themselves i. e. twice as long as in *T. hirta* Roth. With this account agrees also in the main the figure of *T. hirta* Roth in EB. t. 555, nothing like which certainly has been noticed in Mad. No great dependence can be placed perhaps on the duration of the root in either sp. At least in the Mad. pl. it seems, though normally per., to be much influenced by local accidents or circumstances. In all other respects, however, nothing can be more constant in its characters than the present pl. as found both in Mad. and in the Canaries.

I have never seen the beak of the ach. so long or so abrupt at its origin as in RFG. l. c. f. ii. 3, in which it is figured twice the length of the ach. themselves; cf. *T. maroccana* Willk. et Lange l. c.

Hyoseris pygmæa Ait.! Hort. Kew. ed. 1. iii. 130, supposed by Schultz in WB. l. c. very naturally without examination of the original spec. to be the present pl., was founded by Dryan-

der on two small slender spec., each with only 2 l. and 2 fl. and one only with the root left entire, still extant in BH. on a sheet inscribed originally either by Dryander or Solander (I believe with Mr. Bennett the former, but Mr. Carruthers thinks the latter) in pencil *propriâ manu* "*Hyoseris pygmæa* Hort. Kew. 1779." These are in my opinion merely weakly diminutive depauperated or young seedling drawn-up pl. of *T. hirta* Roth (EB. t. 555) with hispid pubescent invol.-scales and (in one) the characteristic præmorse root—such as would be likely to occur in the fine turf of the Kew garden grass-plats. Hence doubtless the subsequent entire omission of *Hyoseris pygmæa* Ait. by Solander in his books and MSS., and by Brown in the 2nd ed. of Hort. Kew.

The sheet in BH. inscribed by Solander *propriâ manu* "Leontodon nudicaule Mscr. Madera," is truly the common Mad. *T. hispida* Roth, var. *a* Lowe *supra*. But *L. nudicaule* Sol. MSS. in BH. is a mixture of this with English *T. hirta* Roth. For though Solander in his MSS. says of his *L. nudicaule* "Radix præmorsa," it is distinctly fusiform or tapshaped in this his original *Mad.* spec. And his other localities, "Revesby in Lincolnshire" and "Petersfield in Hampshire," show him clearly to have had mainly in view *T. hirta* Roth.

†48. Helminthia Juss.

†1. H. echioides (L.).

Harshly pustulato-strigose almost prickly, spinules simple or glochidiate; l. more or less hispid and fringed with spinules, oblong-lanceolate, the lowest attenuato-petiolate obsoletely repand-toothed, the st.-l. cordato-amplexicaul entire, all stiff and wavy; heads clustered in small terminal leafy cymes shortly stalked, their outer leafy br. large cordate-ovate loosely erect spinous or ciliato-spinous and about the length of the lanceolate hispid or hirtose inner scales, the midrib of which is produced from below and beyond the tip into a distinct short ciliato-hirtose awn. — (*Helmintia*) Lam. Ill. t. 648; Brot. i. 328. (*Helminthia*) Pers. ii. 370; Spr. iii. 668; DC. vii. 132 (excl. varr.); Koch 484; WB. ii. 465; Seub. Fl. Az. 34; Coss. et Germ. 430; Bab. 194; Gren. et Godr. ii. 304 (excl. var. β); RFG. xix. 12, t. 27; Willk. et Lange ii. 220. *Picris Echioides* Linn. Sp. ii. 1114; Lam. Dict. v. 310; Buch 194. no. 216; EB. t. 972; Sm. E. Fl. iii. 339.—Herb. ann. Mad. reg. 1, 2, c; PS. reg. 2, 3, cc; ND. cc; GD. reg. 2, ccc; SD. reg. 2, $\frac{c}{2}$. In

cornfields, vineyards and waste ground amongst them, by roadsides &c. everywhere. About Funchal, Loo-fields, S. Martinho, the Mount, Calheta, Prazeres, P^ta^ de S. Lourenço, S. Vicente, &c. March–Sept.—A somewhat coarse robust succulent dull dark sometimes leaden or greyish gr. coarsely strigose almost or quite hispid-spinulose often prickly herb. St. 1–2 ft. high, erect stout ribbed or channelled, widely dichotomously branched, thick gr. succulent hispid. L. stiff shining hispid and pustulato-spinellose. Fl. rather small or inconspicuous, $\frac{1}{2}$–$\frac{3}{4}$ in. in diam., golden-y., the ligules red outside. Inner inv. 10-angular ventricose as in *Sonchus*, its scales with broad pale membranous smooth edges and with the dark gr. hirtose midrib excurrent below the tip into a pectinately hirtose awn. Ach. oblong subangular very finely and closely circularly corrugato-striolate, plump upwards and abruptly pointed or suddenly contracted at top into the fine slender filiform pappus-stalk, dark or light chestnut-brown, scarcely 3 mill. long or 1 broad. Pappus soft pure w. a little longer than the inv., its stalk longer than the ach.

The figures in EB. and RFG. ll. cc. represent two opposite extreme states of the pl.

†49. UROSPERMUM Scop.

†1. U. PICROIDES (L.).

Ann.; l. more or less lyrate and runcinato-pinnatifid, sometimes undivided, spinelloso-denticulate or entire, the lowest oblong petiolate, the st.-l. auriculato-amplexicaul; heads echinulato-hispid chiefly at the base, smooth upwards, the scales ovato-lanceolate, more or less setosely hispid, not velvety-pubescent; ach. shortly stipitate, their beak abruptly swollen or bulbous at the base.—Spr. iii. 662; DC. vii. 116; WB. ii. 466; Koch 485; Seub. Fl. Az. 33; Gren. et Godr. ii. 305; RFG. xix. 12, t. 26. ff. ii. iii.; Willk. et Lange ii. 221. *Tragopogon picroides* Linn. Sp. 1111. no. 7; Vill. Dauph. iii. 72; Lam. Dict. vi. 480; Ill. t. 646. f. 3; Brot. i. 330. *Arnopogon picroides* Pers. ii. 360. no 2.—Herb. ann. Mad. reg. 1, cc; PS. reg. 2, 3, cc; GD. reg. 2, c; SD. reg. 2, r. Waste ground, roadsides, beds of ravines &c., almost everywhere in sunny places. About Funchal to the east and west, &c. March–June chiefly.—A low herbaceous pl. with light gr. harsh stiff hispid almost prickly foliage, very variable in degree of both hispidity and subdivision, intermediate in habit between that of *Helminthia echioides* and *Sonchus oleraceus* L. St. straight erect stiff virgate, 3 or 4–12 in. high, few- (mostly 1–3 or 4-) fld. Fl. rather larger than in *S. oleraceus* L., bright lemon-y., closing about noon, on stout erect straight naked ped. Heads

rather large about ½ in. in diam. rarely an inch, ventricose hard firm compact light gr.; the scales convex downwards combined and fleshy at the base, not pubescent velvety or tomentose, but more or less echinately hispid chiefly downwards, their edges dark purplish brown giving the inv. a striped appearance. Ach. at first y., then olive, lastly chestnut-brown, rather large and peculiar with their long curved hollow bulbous beaks, compressed, very coarsely and prominently muricato-corrugate or tuberculate transversely on the sides and with a curious prominently 3-winged podogyne. Beak 3 or 4 times the length of the ach. shortly and erectly setuloso-hispid, corrugately muriculato-rugulose downwards. Pappus soft w. silky, about the length of the ach. with their beaks, copiously plumose, deciduous.

β. *asperum* DC. et Duby; st. about 1-fld. dwarfish, l. undivided the upper entire.—DC. l. c.; Gren. et Godr. l. c.; RFG. l. c. f. iii. *Tragopogon asperum* Linn. Sp. l. c. no. 8; Lam. Dict. vi. 481; Pers. l. c. no. 3.—Mad. reg. 1, ♀. Beds of Ravines about Funchal, Rib. de Sta Luzia, de S. João, &c. A mere dwarf depauperated state of the sp.

The Açorian *Microderis rigens* (Ait.) has not occurred in Mad. to any botanist or collector, at least within the present century. There exists however in BH. a sheet containing two fine spec. of it, inscribed at the back "Madeira Fr. Masson, 1777." Yet Solander in his MSS., describing from these very spec., and these alone, his "*Hypochœris strigosa* MSS.," adds "*Alfazim brava* Incolis Azorum. Habitat in Insulis Azoribus, Fr. Masson," thus entirely ignoring or repudiating the habitat "Madeira" inscribed on the sheet itself. Again, he describes his *Crepis rigens* from a Kew-Garden spec. (it is precisely the same pl.) on a sheet marked at the back "Hort. Kew. 1779," stating in his MS., but on the authority merely of information from the Kew Garden itself (as appears elsewhere in BH. documents), "Habitat in Madeira ♃ Fr. Masson. Floruit in Horto Regio Kewensi. Julio 1779." Yet he has added subsequently in pencil a? after the word "Madeira," and subjoined in pencil also "Obs. nullum specimen siccum a Masson missum."

Now it is obvious to say that this? and "Obs." were added not in the face or in contradiction of "Madeira Fr. Masson 1777" on the original ex. of Solander's *Hyp. strigosa*, but previously to his recognition of the identity of this latter with his Kew-Garden

Crepis rigens. Yet there would still remain the fact that the added ? is also adverse to his MS. ascription of a Madeiran origin to his original Kew-Garden spec. of *Crepis rigens* itself. And indeed, as it is certain that at some time or other he had recognized himself the identity of his two sp., by writing on the first sheet, marked at the back "Madeira Fr. Masson 1777" (his original *Hypochœris strigosa* MSS.), "Est *Crepis rigens* H. Kew.," and on the second sheet (his original *Crepis rigens*) "*Hypochœris strigosa* Sol.," so it is more probable than otherwise that this recognition was prior to or simultaneous with the publication (1789) of the H. Kew. from his entire omission in that work of all reference by name to his *Hyp. strigosa*, indicating that he was already aware of its identity with his *Crepis rigens.* And then his reference of the latter pl. in the Hort. Kew. simply to the Açores, which is in any case in opposition to the Kew-Garden evidence for Madeira, would be in flat contradiction also to the habitat "Madeira" inscribed at the back of his *Hyp. strigosa*, and would suggest that previously to the publication of the Hort. Kew. he had found reason to set aside both the less certain information derived from Kew Gardens about *Crepis rigens* and the apparently more sure evidence for Madeira from the sheet itself of *Hyp. strigosa.*

But indeed, independently of these considerations, Solander's very particular and pointed reference in his MSS. above quoted of this *Hyp. strigosa* to the Açores, with even its vernacular Açorian Portuguese name added, in the face of its Madeiran superscription, may almost alone suffice to prove him to have possessed some very distinct and certain evidence, superseding in his judgment that of the inscription "Madeira Fr. Masson 1777" on the original sheet itself, and accounting also for his inserted ? after "Madeira" and "Obs." on *Crepis rigens* in pencil, "nullum specimen siccum a Masson missum," in correction of the "Habitat in Madeira, Fr. Masson" before ascribed on the same page of his MSS. to this Kew Garden spec.

On the whole, then, it would be rash without further evidence to admit *M. rigens* (Ait.) to a place in the Mad. Flora, though botanists may be perhaps encouraged to look diligently for it. If found, it will be immediately distinguished by its plumose

nearly sessile or rather perhaps shortly stalked pappus, its scape-like st., umbellate fl., and hispid undivided oblong or elliptic-oblong l.—Seubert (Fl. Az. 33, 34, tt. xii. xiii.) distinguishes two sp. in addition to the original *M. rigens* (Ait.) DC. vii. 128.

†Tribe XXVI. *Scorzonereæ* Schultz, Koch. .

†50. Geropogon Linn.

†1. G. glaber Jacq.

The only sp.—Jacq. Hort. Vind. i. t. 33; Willk. et Lange ii. 227. *G. glabrum* Linn. Sp. 1109; Lam. Dict. vi. 482, Ill. t. 646; BM. t. 479; Pers. ii. 359. no. 1; Buch 194. no. 215; DC. vii. 111; Gren. et Godr. ii. 314; RFG. xix. 13, t. 28. ff. i. ii. 6–12. *G. australis* Spr. Syst. iii. 663. *G. hybridus* Schultz in WB. ii. 472.—Herb. ann. Mad. reg. 1, r; PS. reg. 2, c. Amongst corn in the Loo-fields and on P^{ta} de S. Lourenço at Caniçal and about the Piedade; P^{to} S^{to} general in cornfields towards Pico d'Anna Ferreira, Camacha, Serra de Fora, &c. March–May.—Always altogether smooth in Mad. and PS., with linear long grass-like grass-gr. foliage, very variable in size and luxuriance, from 2 or 3 in. high simple and single fld. to 12 or more in. branched and many-fld. Root strong simple or tapshaped and fleshy, pale or whitish. L. closely sheathing the thick base of the st. like those of *Allium Porrum* or *sativum* L., linear-acuminate elongate entire carinate bright gr. with a pale midrib, 3–10 or 12 in. long, 3–6 lines broad, half-st.-clasping. St. erect hard stiff round simple or fork-branched from the base with a broader l. at each fork. Fl. very singular, reminding one of *Agrostemma Githago* L. with their few enormously long linear gr. inv.-scales far exceeding the bright lilac or rose-pink florets, closing before noon, small, ½–¾ in. in diam. Ped. naked fistulose. Scales of inv. 7–9 linear finely acuminate, 1½–2 in. long, gr. with pale edges, carinate especially in fr. and then nearly as long as and partly sheathing the outer marginal ach. Flts. about 20; ligules of the outer scarcely half the length of the long free points of the invol. scales which rise above or beyond them. Ach. fusiform very slender and attenuately long-beaked, striate, 1½–2 in. long with their awns or pappus, the beaks minutely hispid-scabrous. Pappus of the outer ach. of 5 simple (not plumose) stiff minutely hispido-scabrous unequal awns or setæ, mostly 3 long, 2 short; of the inner deciduous ach. many-rayed, rays finely and softly plumose, not deciduous. Recept. sparingly chaffy; scales few very fine slender narrow and filmy, about ½ in. long, produced into fine hair-like points.

Tribe XXVII. *Hypochœrideæ* Less.

51. HYPOCHŒRIS L.

§ 1. *Genuinæ* Koch. Pappus in 2 rows; hairs of outer row simple-scabrous, of inner plumose.

1. H. GLABRA L.

Stemless. Root *ann. simple slender*, tapshaped; fl.-st. radical mostly naked leafless or with only now and then a sessile l. at the forks, mostly simple or sparingly branched, few-fld.; l. nearly all radical oblong attenuate downwards, *repandly sinuate-toothed*, teeth sharp *triangular*, sinuses *shallow rounded*; fl. *small, the flts. not longer than the inner and longer scales of inv.*; ped. 1-fld. long thickened at top, very sparingly bracteolate; scales of inv. flat smooth or naked *without any fringed or echinato-serrate keel or crest*; ach. of disk mostly with a beak as long as themselves, of margin mostly erostrate; pappus mostly stipitate.—Koch 490; Coss. et Germ. ii. 426; Bab. 191; Gren. et Godr. ii. 292; RFG. xix. 22, t. 47. ff. ii. iii. iv.; Willk. et Lange Fl. Hisp. ii. 228.—Herb. ann. Mad. 1, 2, 3. ccc; PS. reg. 2, 3, c; GD. reg. 2, rr.—Varr.:—

a. genuina Godr. l. c.; Willk. et Lange l. c.; ach. of *outer row erostrate truncate* with the pappus *sessile*, of disk attenuate into a beak or pappus-stalk as long as themselves.—*H. glabra a* RFG. l. c. f. ii.; *a. vulgaris*, Coss. et Germ. l. c. 427. *H. glabra* Bab. l. c. (excl. var. *β*). *H. glabra* Linn. Sp. 1140; Vill. Dauph. iii. 64; Lam. Dict. v. 571, Ill. t. 656. f. 1; EB. t. 575; Pers. ii. 378. no. 5; Buch 194. no. 238; Hook. Fl. Sc. i. 234; Sm. E. Fl. iii. 375; DC. vii. 90; Seub. Fl. Az. 33. *H. hispida* and *H. dimorpha* Brot. Fl. Lus. i. 332. "*H. adscendens* Brot. Phytogr. Lus. t. 25."—Mad. in vineyards, by roadsides, on sunny rocky banks and in mountain pastures in the turf everywhere especially in dry poor soil or exposed places; e. g. at top of ridge between the Valle and Rib. de João Gomes, vineyards below S. Roque's Church, mountain pastures above the Mount, in the Rib. das Cales and up the Caminho do Meio; at Camacha, head of Rib. Fundo at the Fanal below the Paul, at the Serrado do Porto da Cruz, St. Antº da Serra, &c.; in PS. on N. side of Pico d'Anna Ferreira, and on Pico do Castello; in GD. on highest peaks. Jan.–July.

β. Loiseleuriana Godr. l. c.; Willk. et Lange l. c.; ach. *all attenuately beaked* with the pappus more or less stipitate (those of the outer row often only half-beaked).—*H. glabra β* Bab. l. c.; b. RFG. l. c. f. iii.; *γ rostrata* Coss. et Germ. l. c. 427. *H. Balbisii* "Loisel. Not. 124;" DC. vii. 91; Schultz in WB. ii. 473.—Mad. rrr, only an odd pl. here and there intermixed

with *a*; e. g. in mountain pastures towards the Icehouse, and in fields at S. Antº da Serra near Mr. Blandy's house. May–July.—Judging from Mad. spec., this is a mere occasional chance-form of *α*; and intermediate forms frequently occur with the pappus of some or all of the outer ach. with a stalk only half instead of quite the length (as in the inner) of the ach. themselves.

A most variable pl. not only in size but in all its characters. L. spreading in a flat rosette close-pressed to the ground, sharply sinuato-dentate; in *a* mostly hirtose or hispid all over above, smooth beneath, mostly pale gr. subglaucescent, sometimes shining bright gr., often with a red midrib and turning red or rose-colour in withering; in *β* mostly hispid only at the edges or on the midrib; in both turning red, pink, or rose-colour in withering. Both vary equally in luxuriance and stature. Fl.-st. one or more rising in succession like scapes from the radical leaf-rose, from 2 or 3 to 12 or even 18 in. high, straight erect virgate wiry quite smooth and naked except a small bract (very rarely a sessile l.) at the forks, sparingly and remotely branched, often 1-fld. scape-like. Ped. naked without bracts, swollen and tubular beneath the fl., the latter erect in bud, open only in the morning, closing at noon, only ½ in. in diam., the florets not exceeding the inv. Heads narrowly lanceolate-oblong or slenderly cylindric. Scales of inv. flat without any fringed keel or crest but quite smooth and naked, imbricate in several rows, their tips dark livid or lurid v. or olive. Ach. fusiform muricately ribbed purplish-chestnut. Pappus double; outer row short simple scabrous or denticulate, inner longer plumose. Scales of recept. linear, in fr. finely setaceo-acuminate filmy silvery-w., rather shorter than the pappus or not quite so long or finely hair-pointed as in *H. radicata* L., very caducous.

H. dimorpha Brot. with the sessile pappus of the outer marginal ach. simply pilose, not plumose, has not occurred in Mad.; but it can be scarcely more than a slight modification of var. *a*.

Var. *γ erostris* Godr. l. c. with all the ach. beakless and pappus in all sessile (Willk. et Lange l. c.; var. *β erostris*, Coss. et Germ. l. c.; var. c, RFG. l. c. f. iv.) has also not been noticed in Mad., but may perhaps be found.

††2. H. RADICATA L. *a.*

Stemless; root *per. or at least bien. partly stoloniferous or creeping thickish fleshy subdivided* the divisions tapshaped; fl.-st. radical always naked leafless numerous from the crown ascending elongately branched; l. all radical *furry or hispido-pubescent* oblong attenuate downwards deeply *sinuato-pinnatifid*, lobes *obtuse or rounded* as broad as deep; fl. *large*, the florets *much longer than the longer inner scales of inv.*; ped. 1-fld. elongate thickened at top, sparingly bracteolate; scales of inv. keeled, keel black-crested at the tip, often ciliately setose-fringed below; ach. all mostly with a beak longer than themselves.—Linn. Sp. 1140; Vill. Dauph. iii. 63; Lam. Enc. v. 570; EB. t. 831; Brot. i. 331; Pers. ii. 378; Sm. E. Fl. iii. 376; DC. vii. 91; Koch 490; Coss. et Germ. ii. 427; Bab. 192; Gren. et Godr. ii. 293; RFG. xix. 21, t. 46, and t. 47. f. i. (statu depauperato unifloro); Willk. et Lange ii. 228.

a. rostrata Moris., Gr. et Godr. l. c.; Willk. et Lange l. c.; ach. all more or less beaked.—*H. neapolitana* DC. vii. 91.—Herb. per. Mad. reg. 2, r. Abundant and completely naturalized in fields and by roadsides at St. Antº da Serra, extending already a mile or more along the road towards Funchal from Mr. Blandy's house and farm which have been its centre of diffusion, though not introduced more than 15 or 20 years ago with grass-seeds from England. May–July.—Root strong vertical dividing below the thickened per. crown into 2 or 3 tap-shaped branches running deep into the ground, often stoloniferous with stout short subterranean horizontal runners from beneath the crown forming fresh pl. Leaf-st. 0 or very short; l. all in a flat rosette of 2 or 3 rows very close-pressed to the ground and killing all other herbage, dull hoary gr. and thickly furry with short w. bristly pubescence on both sides, 3–6 in. long, ½–1 in. broad, never red or rose-coloured. Fl.-st. several or many ascending in quick succession or together from the flat radical leaf-star like scapes, 6–18 in. high remotely fork-branched hard stiff twig-like or wiry but gr. and slender, quite naked and leafless except a few minute bracts at the forks, sprinkled with bristly w. hairs downwards, villose at the base. Ped. 4 or 5 in. long angular-striate sparingly bracteolate and thickened upwards under the anthodium, br. remote scattered minute linear-lanceolate erect livid or lurid purple or v. Fl.-buds always erect, when very young globose or hemispherical, then oblong, and when closed in fl. or in fr. pyramidal and ventricose at the base. Fl. very like those of *Thrincia hispida* Roth, but larger, 1–1¾ in. in diam. or from the size of a half-crown to that of a crown or dollar, 3 or 4 times as large as those of *H. glabra* L. and of a deeper fuller y. as in *Thr. hispida* Roth or *Taraxacum officinale* Wigg., the outer

broader ligules dark olive beneath. Florets with their ligules twice the length of inv., their mouth dimidiately fringed or crowned with y. hairs. Scales of inv. closely imbricate in many rows, the lowest short ovate, the rest oblong or linear-lanceolate keeled mostly smooth but sometimes hirtose at least downwards more or less with w. bristly hairs, dark gr. with lurid dark livid or purpureo-violaceous tips like the bracts; the keel often setose-fringed or bearded with stiff w. bristles, and always darkly echinato-serrate or crested upwards at the tips. Recept. chaffy; chaffs (as in *H. glabra* L.) long linear finely acuminate y. at the tips in fl., filmy w. and membranous below, shorter than the florets; in fr. setaceo-acuminate with fine hair-like withered black tips equalling the pappus and deciduous with the ach.; the latter fusiform muricately ribbed or echinato-scabrous chestnut-brown, all with slender long beaks longer than the ach. themselves, smooth upwards. Pappus dirty w. uniform stipitate in 2 rows, the outer row simple scabro-denticulate short, inner longer plumose.

This resembles the common English *Leontodon autumnale* L. (EB. t. 830), which differs however entirely in its truncate root, shorter less branched sometimes simple 1-fld. copiously scaly scapes or fl.-stems and naked chaffless recept.: belonging indeed to the foregoing Tribe, *Leontodonteæ*.

The var. *β heterocarpa* Moris. with the outer ach. beakless, from the Salinas of Cette (Gr. et Godr. l. c.), has not occurred in Mad.

Villars l. c. 64, well observes that the name *juncea* would be more obviously suitable to this pl. in allusion to its rush-like st. than *radicata* from its strong deep-running roots.

†Tribe XXVIII. *Chondrilleæ*.

†52. Taraxacum Juss.

†1. T. officinale Wigg. **Dandelion.**

Nearly or quite smooth; l. in a radical tuft or rosette oblong runcinate with triangular lobes; outer lfts. or scales of inv. narrow-lanceolate squarrosely reflexed simple and scarcely or not at all gibbous or callous at the tip; ach. pale olive-grey.—Vill. Dauph. iii. 72; Brot. i. 324; Gren. et Godr. ii. 316; *a. genuinum* Koch 492; WB. ii. 424; RFG. xix. 25, t. 53; Willk. et Lange ii. 230. *T. Dens-Leonis* Desf. ii. 228; Lam.

Dict. v. 348, Ill. t. 653; DC. vii. 145; Coss. et Germ. *a. officinale* ii. 432. *Leontodon Taraxacum* Linn. Sp. 1122; Pers. ii. 367; EB. t. 510; Hook. Fl. Sc. i. 227; Sm. E. Fl. iii. 349; Bab. 195 (excl. varr.).—Herb. per. Mad. reg. 1, 2, r. Vineyards, roadsides and waste ground about Funchal, at the Valle, Mount &c.; Magdalena in the Quintal of S^{r} Nuno de Freitas e Lomellino; Rib. do Fayal along the new Levada, &c. Oct.–June.—Precisely in every respect the common universal British or European pl.; and none of the other forms or allied sp. have ever occurred either in Mad. or the Canaries. Root-stock a little tomentose or woolly at the crown. L. shining bright gr. mostly smooth, 2–4 or 5 in. long. Scapes 1-fld. fistulose pale often reddish 2–6 in. long. Fl. bright golden-y. 1–1½ in. in diam. produced in long succession. Heads in fr. with their elegant w. pappus globose 1–2 in. in diam., the ach. very caducous.

Much used as a salad on the continent, but disregarded in Mad.

Tribe XXIX. *Lactuceæ* Less.

53. Lactuca L.

1. L. Scariola L.

St. erect tall stiff straight simple virgate paniculately shortly branched at top pale yellowish or straw-colour aculeato-strigose downwards, leafy about halfway up; l. not decurrent more or less glaucous runcinately sinuato-pinnatifid with the midrib beneath strongly fringed or ciliately aculeato-setose, the edges more finely spinelloso-denticulate; the lower simply the upper sagittately semiamplexicaul and reduced above the middle of the st. to small inconspicuous entire sheathing lanceolate br.; cymes few-fld. on short spreading side-branches towards the top of the st. forming a naked leafless oblong pyramidate panicle; fl. small pale lemon-y.; ach. black or dark coffee-brown striate shorter than their beak.—Linn. Sp. 1119 (excl. varr.); Vill. Dauph. iii. 156; Brot. i. 315; Pers. ii. 364 (excl. varr.); EB. t. 268 (small depauperated); Sm. E. Fl. iii. 346; DC. vii. 137 (excl. varr.); Koch 495; Coss. et Germ. ii. 434 (excl. var. *β*); Bab. 194; Gren. et Godr. ii. 319 (excl. var. *β*); RFG. xix. 33, t. 70. ff. i. ii.; Willk. et Lange ii. 238. *Lactuca sylvestris* Lam. Dict. iii. 406 (excl. var. *β*); *β. coriacea* Schultz in WB. ii. 422. —Herb. ann. Mad. reg. 3 and occasionally 2, $\frac{c}{2}$; GD. reg. 2, rr. Ravines and wooded banks, an odd pl. only here and there; Rib. de S^{ta} Luzia, ravine west of the Alegria, Vasco Gil near the bridge, Chestnut-woods above the Jardim da Serra, Pico Grande,

Lombo Grande, Rib. de S. Jorge, &c., GD. up the central valley. June–Sept.—A pl. of peculiar aspect with its pale tall round wand-like st. 2–5 ft. high often tinged with red or purple and harsh dry or stiffish but scarcely coriaceous foliage. Lower l. 4–6 in. long, 1½–2 broad, gradually decreasing in size upwards and passing above the middle of the st. into mere small ovate-lanceolate dark purplish-v. inconspicuous bracts; the midrib of the st.-l. strigosely fringed beneath for about half its length with copious pale harsh prickly bristles like those of the lower part of the st. Fl. small in lateral spreading short few-fld. cymes along the upper third or fourth part of the st. forming a naked terminal pyramidal-oblong panicle 6–18 in. long and half as broad; the branches and scales of inv. smooth and usually dark v. or purple. Heads few-fld. 4–5 lines long, 1–1½ broad; scales linear-lanceolate smooth 6 lines long in fr. Ach. deep coal-black 1½ line long, ¾ broad, obcuneate abruptly apiculate or shortly beaked and pectinato-ciliate or ciliato-setulose at top, much flattened, marginate, longitudinally ribbed and most elegantly and closely striolate transversely, the beak produced into a slender pale or w. pappus-stalk about the length of the ach. itself. Pappus very fine and silky snow-w. a little longer than its stalk.

The l. are more frequently horizontal or spreading in Mad. than erect.

Lactuca sativa L. (Common garden Lettuce, *Alface* Port.) var. *a* (Roman Lettuce) and more especially *L. capitata* DC. (Cos Lettuce) are commonly cult. in Mad.; but I have never seen them in any degree naturalized or growing spontaneously. Von Buch however includes the former in his Mad. List 194. no. 221, on the authority of a spec. still extant in BH., marked at the back of the sheet "Madera 1768," and recorded by Solander in his MSS. as collected by Banks and Solander "in vinetis."

54. Sonchus L.

(*a*) Herbaceous, annual.

†1. S. oleraceus L. **Sowthistle.** *Serralha.*

St. somewhat firm and slender branched; l. flat soft flaccid mostly feebly and inconspicuously spinuloso-toothed and unarmed, smoky opake dull gr. above, strongly glaucous beneath, deeply pinnately lyrate with the terminal lobe mostly large and deltoidal, sometimes pectinately laciniate, sometimes undivided; auricles of the st.-l. acute or acuminate and simply spreading; heads cymoso-umbellate, ped. and inv. mostly naked smooth sometimes glandulose; ach. immarginate longitudinally obsoletely many-ribbed or striate on each flat side and trans-

versely muriculato-granulate or rugose.—Linn. Sp. 1116 (excl. varr. γ, δ); Lam. Dict. iii. 398 (excl. var. β); Desf. ii. 224; Brot. i. 316 (excl. var. 2); Pers. ii. 363 (excl. var. β); Buch 194. no. 217; EB. t. 843; Sm. E. Fl. iii. 343 (excl. varr. γ, δ); Spr. iii. 648; Koch 497; Coss. et Germ. ii. 436; J. A. Schm. Fl. Verd. 203; Bab. 195; Gren. et Godr. ii. 324; RFG. xix. 28, t. 59. f. i.; Willk. et Lange ii. 242. *S. lævis* Vill. Dauph. iii. 158; WB. ii. 447. *S. ciliatus* DC. vii. 185.—Herb. ann. Mad. and PS. reg. 1, 2, 3, ccc; ND, GD, SD, c. In vineyards, gardens, cornfields, beds of ravines, by roadsides, &c. everywhere a universal weed. At all seasons. Varr.:—

α. *triangularis* Wallr.; l. runcinato-pinnatipartite, terminal lobe large triangular.—RFG. l. c. f. i.; Willk. et Lange l. c.; *a. runcinatus* Coss. et Germ. l. c.; β. *runcinatus* Koch l. c. *S. lævis* B, Vill. l. c.—The usual form.

β. *lacerus* Wallr.; l. pinnatifid or pinnatipartite, lobes subequal cuspidate-toothed or spinulose.—RFG. l. c.; Willk. et Lange l. c.; Coss. et Germ. l. c.; γ Koch l. c.—Less frequent than *a* in Mad.; in ND. low, branched, bushy leafy prickly.

γ. *laciniatus* Lowe; l. laciniately pectinato-lyrate finely divided, the segm. narrow elongate linear or linear-lanceolate.—ND. near the ruined house. About a foot high, much branched bushy leafy, altogether smooth. Foliage much like that of *Tolpis succulenta* (Ait.) *a*, dark smoky gr.; auricles acute. Heads numerous in ample forked cymes, not umbellate, very prominently and abruptly ventricose and fleshy at the base. Ach. and pappus quite normal. A very distinct well-marked form.

δ. *integrifolius* Wallr.; l. more or less undivided oblong or sinuato-panduriform toothed.—γ RFG. l. c.; Willk. et Lange l. c.; *a* Koch l. c. *S. lævis* A, Vill. l. c.—Occasionally in Mad.

The peculiar seeds at once distinguish from the following sp. every form of this most variable pl.

†2. S. ASPER Vill.

St. thick succulent branched: l. firm harsh stiff crispate copiously sharply and ciliately spinous-toothed and harshly armed or prickly, shining lucid mostly bright light or full gr. above, glaucescent beneath, shallowly sinuato-pinnatifid or runcinate (not lyrate) or undivided, auricles of the st.-l. rounded subdecurrent erectly stem-clasping or spirally up-curved and subperfoliate; heads subumbellate, ped. and inv. mostly naked smooth; ach. winged or marginate strongly and distinctly 3-ribbed on each flat face, sometimes denticulate or muricate

at the edges, not transversely muriculato-granulate or rugose.—Vill. Dauph. iii. 158; Spr. iii. 649; EBS. tt. 2765, 2766; Koch 497; WB. ii. 448; Coss. et Germ. ii. 436; Bab. 195; Gren. et Godr. ii. 324; RFG. xix. 28, t. 59. f. ii., t. 60. ff. i., ii.; Willk. et Lange ii. 242. *S. oleraceus* γ, δ, Linn. Sp. 1117; Sm. E. Fl. iii. 343; var. β Lam. Dict. iii. 398; Pers. ii. 363; var. 2 Brot. i. 316. *S. fallax* (Wallr.) DC. vii. 185; Seub. Fl. Az. 34.—Herb. ann. Mad. 1, 2, r; ND. and GD. r/2; SD. c/2., In the north chiefly of Mad.; chestnut-woods and waste ground by roadsides, borders of cornfields and cult. ground at S. Vicente, Boa Ventura, &c., common. ND. and GD. at top sparingly. At most seasons, chiefly May–Sept. Varr. :—

a. vulgaris Coss. et Germ. l. c.; l. runcinately or sinuately pinnatifid waved prickly-ciliate.—*S. asper* β EBS. t. 2766; WB. l. c. 449, var. *a.* β.—Mad. S. Vicente, borders of cornfields; ND. and GD. at top.

β. *integrifolia*; l. undivided prickly-ciliate.—*S. asper a* EBS. t. 2765; WB. l. c. var. *a. a*; RFG. t. 59. f. ii. Chestnut-woods S. Vicente and Boa Ventura in Mad.

At once distinguished from all states of *S. oleraceus* L. by its harsh prickly less divided merely runcinate or sinuately pinnatifid lucid light gr. stiffer crispate l. with more or less helicoidal rounded auricles, stouter thicker softer or more juicy st., and more flattened and broadly winged distinctly 3-ribbed seeds quite devoid of transverse granulations. The edges of the l. are copiously fringed with prickles pointing irregularly up and down, not subremote and in the plane of the l. as usually in *S. oleraceus* L., their auricles rounded and more or less cochleate. Pappus in this as in the preceding sp. very soft and cottony.

The above varr. *a* and β both belong to the var. β. *pungens* Bischff. of RFG. l. c. and Willk. et Lange l. c. The unarmed var. *a. inermis* Bischff. (RFG. l. c. t. 60. ff. i., ii.) = β. *mollis* Coss. et Germ. l. c. has not been hitherto observed, but may very probably be found in Mad.

(*b*) Herbaceous, perennial.

3. S. USTULATUS Lowe.

Herbaceous stemless or only occasionally and shortly subcaulescent, very smooth; l. all radical somewhat stiff or fleshy glaucous between the veins especially beneath, oblong-lanceo-

late subcaudato-acuminate pectinately or runcinately pinnatipartite or pinnatisect, their lobes or pinnæ shortly oblong acute or acuminate subentire or sparingly and remotely toothed or subpinnatifid; fl.-st. erect single scape-like naked leafless regularly dichotomous or fork-branched upwards into a naked mostly few-fld. corymbose cyme, the branches and ped. divaricate smooth naked, the latter thickened upwards; scales of inv. close-pressed discoloured ustulate (dark reddish v. or blackish-purple).—Prim. 22; DC.! vii. 189; WB. ii. 441 (Obs. 2).—Herb. per. Mad. reg. 1, $\frac{c}{2}$ or $\frac{r}{2}$. Sea-cliffs at the Praia, mouth of the Soccorridos Ravine, &c.; at Paul do Mar; P^ta^ do Pargo; the Entrosa abundant; indeed general along both the S. and N. coasts of Mad. especially to the westward, but not found in PS. and rarely in the Desertas. Oct.–Dec. Varr.:—

α. angustifolia; l. very glaucous stiff and fleshy acute or finely caudato-acuminate, pinnæ pectinate distinct narrow mostly much longer (3 or 4 times) than broad sharp-toothed acute or acuminate.—Prim. 23; var. β DC.! l. c. *S. dentatus* Sol.! in BH. et MSS.; Buch! 194. no. 220.—On exposed, dry, or sunny rocks.

β. imbricata; like *α*, but pinnæ of l. approximato-imbricate and broadly rhomboidal, as broad as long, acute sharply angular, the terminal lobe acute narrow small.—*S. ustulatus* Mason! 249 A, Madera, Dezertas, N. H. Mason (1857) in BH.—The axils of the l. are fawn-coloured-velvety in the single example in BH.

γ. latifolia; l. scarcely glaucous above, somewhat flaccid thin or membranous; lobes larger broader more remote and leafy than in *α*, about twice as long as broad.—Var. β Prim. 23: var. *α* DC.! l. c. *S. ustulatus* Mason! no. 249 (Madera N. H. Mason 1857) in BH. *S. squarrosus* s. *fruticosus* β Sol.! MSS. and BH.—In more sheltered, hollow, moist or shady spots; a mere luxuriant form of the sp.

Root strong thick fleshy scarcely branched or fibrous, striking deep into the clefts or crevices of perpendicular bare walls of rock, bearing at the crown one or more rose-like tufts of radiating stiffish succulent more or less glaucous and runcinately pinnate l., out of the centre of which rises the single annual stiffly erect hard but truly herbaceous round glaucescent naked fl.-st. from 6–12 in. high, dying down after flowering quite to the base. True st. none or only occasional in old pl.; and then short and thick (1–2 or 3 in. long), rough or rugged with the coarse and crowded remains of the l. of former years, hard but not really woody, the pl. being always simply and truly herbaceous. Whole pl. very smooth except the quite young l. or

leaf-buds and the bases or axils of the older l. at their junction with the crown of the root or short st. which are covered in *α* and *β* with a dense velvety fawn-coloured tomentum, exactly as in the unique example in BH. of *S. dentatus* Sol. MSS. and also in the Tenerifan truly herbaceous *S. radicatus* Ait. This is in fact a very general char. of the tips of the branches and young l. in the Mad. and Can. *Sonchi*. L. 3–6 in. long, 1–2 broad, in outline lanceolate acuminate, their lobes or pinnæ 6–8 on each side, regular and equidistant, decreasing equably in length from the middle upwards and downwards, the terminal lobe or point of the l. being very narrow small and acuminato-lanceolate or subcaudate. Cyme regularly dichotomous throughout wholly naked or leafless except a small inconspicuous membranous reddish or purplish finely acuminate scale-like br. at each fork and occasionally one or two similar minute deciduous bractlets scattered on the ped. Fl. bright y., about 1 or 1½ in. in diam., with rather long lax ligules. Outer scales of inv. short broadly half-ovate subremote and exposing the pale gr. fleshy swollen base of the anthod. between them; inner scales linear-oblong acute and blackish or discoloured like the outer; all compactly close-pressed in all stages. Ach. rarely perfected, irregularly oblong or oblong-oval angular striated very pale brown. Pappus short but copious silky-w. rough simple very deciduous.

γ, with short broad obtuse pinnæ, is merely a rank luxuriant form of *α*.

Growing on the most exposed and arid rocks in the hottest situations, this very peculiar and well-marked sp. is completely burnt up during the summer. Immediately after the first autumnal rains it puts forth in Oct. or early in Nov. a fresh rose of l. from the middle of the dead and dried-up remains of those of the former winter; and the scape and fl. appear soon afterwards, not lasting usually beyond Dec.

Though not recorded by Webb as a Canarian pl., *S. ustulatus* occurs at Taganana and thence to P^ta^ Anaga along the N. coast of Tenerife. The Can. *S. radicatus* (Ait.), also a truly herbaceous pl. with precisely the same habit, is at once distinguishable by its lyrate l. with a large deltoidal terminal lobe and only 3 or 4 lateral lobes or pinnæ on each side, its 1 or 2-leaved fl.-st. and irregularly not dichotomously branched cyme. Its ascription in the 1st ed. of Hort. Kew. to Madeira was a pure mistake, which was however corrected in the 2nd.

It is scarcely conceivable how such a consummate discri-

minator as Solander could have referred any state of this pl. as a var. to *S. fruticosus*.

(*c*) Shrubby, per.

4. S. PINNATUS Ait.

Altogether smooth sparingly branched, branches rather long and slender straggling straight naked even; l. in terminal tufts full or dark gr. above, glaucescent beneath, lanceolate acute or linear-lanceolate acuminato-caudate pectinately pinnate, pinnæ numerous distinct lanceolate or linear remotely pinnatifidly toothed or subentire; cyme terminal large ample many-fld. naked except a small pinnate l. at the axil of the main lower forks compound, branches straight rigid divaricate, fl. umbellate at their ends; ped. slender thickened upwards, naked or with a few minute scarious deciduous bractlets; scales of inv. close-pressed pale gr. darker upwards.—Ait. ! Hort. Kew. ed. 1. iii. 116; Pers. ii. 363; Buch ! 194. no. 218; Spr. iii. 647; DC. ! vii. 188; WB. ii. 439 (excl. var. *β. Palmensis* t. 130). *S. hyoserifolius* v. *hyoseridifolius* Hornem. "Hort. Hafn. ii. 752;" Spr. iii. 647 (certissime sec. Schultz, in WB. ii. 441 dicentem, "Nomine *S. pinnati* cl. Hornem. semina plantæ suæ e Britannia habuisse").—Shr. per. Mad. reg. 3, $\frac{c}{g}$. Perpendicular rocks and cliffs high up in all the principal ravines; Rib. de S.ª Luzia, da Metade, de S. Jorge, da Boa Ventura, &c.; Caminho Central between the Primeira Vista and Pico Grande, and especially abundant descending thence into the Curral das Freiras. July, Aug.—A fine shr. 2–6 ft. high starting from the clefts of high bare walls of rock, with long naked flauntingly spreading or ascending woody greyish smooth and even branches about the thickness of the little finger, each with a terminal spreading rose or tuft of shining handsome foliage. L. 6–12 in. long or more, extremely variable both in general outline and in the breadth of the pinnæ, dark gr. above with a pale midrib, beneath slightly glaucous with darker reticulating veins; pinnæ 10–15 or more, regularly pectinate and becoming gradually shorter from the middle towards each end; those of the upper l. always narrower and more entire than in the lower; the terminal lobe mostly acuminato-caudate and entire. Cyme rising from the middle of the tufts of l. very large ample and many-fld. with a small pinnate l. at each of its lower main divisions, otherwise naked except a few inconspicuous scarious brown scale-like bractlets, one at each division; it extends from 1 to 3 or 4 ft. beyond the terminal leaf-tuft, and its branches are slender stiff pale gr. elegantly marked with darker gr. lines. Fl. large 1–2 in. in diam. bright golden-y.; upper half of tube of florets copiously glandular-hairy or pubescent: stigmas recurved. Heads erect, in all stages obovate or pear-

shaped, fleshy at the base, of a pale delicate gr.; outer scales of inv. ovato-lanceolate narrower and longer than in *S. ustulatus*, inner lanceolato-ligulate obtuse and obscurely ciliato-puberulous or erosulo-denticulate towards the tips. Ach. pale brown elliptic-oblong flattened truncate 2–2¾ mill. long, ¾–1 mill. broad in the middle, longitudinally ribbed, finely and elegantly reticulato-granulate with transverse striæ. Pappus w. extremely fine, a little longer than the ach., sessile.

Schultz in WB. ii. 441, makes 4 varr. or forms of the Mad. pl. from the shape of the pinnæ, &c. Having for many years observed the pl. on its native rocks, I can distinguish only the 2 following forms:—

a. angustiloba; pinnæ narrow linear-lanceolate acuminate subpinnatifidly toothed, the terminal lobe subelongato-caudate.—*S. pinnatus* Ait., Pers., Buch, Spr., DC.! fl. cc.; form i. *Candolleana* and ii. *Webbiana* Schultz l. c.

β. latiloba; pinnæ broader oblong not acuminate sparingly toothed or subentire, the terminal lobe not produced.—*S. pinnatus* form iii. *Banksiana* and iv. *Hornemanniana* Schultz l. c.

In both these forms, which pass into each other through numberless gradations, the number of pinnæ and all other characters employed by Schultz have no sort of constancy, varying on different branches of the same pl.

The Canarian var. *β. Palmensis* WB. t. 130, with its much smaller fl., &c., requires further investigation. It looks like something very different from any form of the Mad. pl.

5. S. FRUTICOSUS Linn. fil. *Serralha da Rocha.*

Smooth remotely branched, branches short thick erect rugged: l. uniform full gr. in terminal tufts oblongo-lanceolate sinuato-pinnatifid with broad few shallow rounded lobes or lyrate with the large terminal lobe elongato-triangular, the upper undivided repand-angulate or quite entire, all ciliato-denticulate; cyme terminal leafy-bracteate, fl. large umbellate in sets of 2 or 3–5 together at the ends of its branches on rather long erect ped. thickened and squarrosely leafy-bracteate at top; br. of ped. and at the forks linear elongate wavy spreading or reflexed and pendulous entire; outer scales of inv. linear-acuminate leafy squarrosely reflexed dark gr.—"Linn. fil. Suppl. 346; Hérit. Stip. Nov. 171, t. 81;" Pers. ii. 363 (not Jacquin). *S. squamosus* (misprint for *squarrosus*) Buch! 194. no. 219. *S. squarrosus* v. *fruticosus a* Sol.! MSS. and Bll. *S. squarrosus* Spr. iii. 647; DC.! vii. 187.—Shr. per. Mad. reg. 3 and

upper part of 2, cc. Wet perpendicular rocks in almost all the principal ravines; e. g. Rib. de S^ta^ Luzia near the Waterfall, R. Frio, R. da Metade, de S. Jorge, da Boa Ventura, &c., at Camacha, S. Ant^o^ da Serra &c. June, July.—Almost subarborescent and gigantic in all its parts, being from 4 or 5 to 10 or 12 ft. high with a trunk often as thick as the arm (2–4 in. in diam.) and the ultimate branches as thick as the forefinger ending in a large spreading or radiating tuft or rose of shining full grass-gr. l. 10–30 in. long and 2–6 broad, broadly lobed with 5 or 6 mostly rounded lobes and sinuses on each side like oak-l. (*Quercus Robur* L.) and a large triangular pointed terminal lobe longer than broad. Sometimes the side-lobes are subacute or angular, and the quite young l. are always w. or hoary with a short thick furfuraceo-cottony tomentum soon disappearing. Cyme very large 1–2 ft. broad and high many-fld. with long pendulous or horizontal narrow leafy bracts at each of its divisions, auriculate or caudate at their base; each branch or division ending in an umbel of mostly 3 or 5 fl., round erect stiff naked. Ped. about 3 in. long erect round slender, naked below, thickened and furnished upwards with a few scattered reflexed linear waved entire leafy br. Fl. like those of the common Dandelion (*Taraxacum officinale* Wigg.) but very large, 2–3 in. in diam. bright golden y., nearly or quite scentless. Anthod. remarkably squarrose, the outer scales with reflexed leafy gr. points, the inner dark olive-black as if bronzed upwards. Ach. as in *S. pinnatus* but with 3 strong distinct ribs on each flat side and pappus much longer and more copious.

I have cultivated this fine pl. for many years in England. All it requires is protection in the house or greenhouse from severe frost during the winter months. Planted out in May or June it flourishes till late in the Autumn, flowering abundantly in August, and rendered by its large and handsome foliage at all times a striking ornamental plant.

Tribe XXX. *Crepideæ* Bischoff.

55. CREPIS L.

Sect. 1. *Barkhausia* Mnch. Ach. all or those at least of disk distinctly beaked.

1. C. LACINIATA Lowe. *Letubra mansa. Almeirão* or *Almeirante.*

Ann. nearly or quite *smooth shining bright full gr.*; st. erect leafy sparingly corymbosely fork-branched from the base or crown; l. smooth shining full or dark gr., laciniato-pinnatifid

or runcinate, the lower mostly lyrate, upper irregularly laciniate or sinuate-toothed auriculato-sessile or sagittato-amplexicaul, uppermost reduced to narrow or linear auriculate entire bracts; ped. mealy-puberulous and with a few black glands; scales of inv. mealy outside, the keel mostly fringed more or less with short conical capitate black glands or spinules, finely adpressedly silky-w. inside, outer lax unequal half or more than half the length of inner, erectly ascending (neither adpressed nor spreading) forming a short loose calycle; cymes loosely corymbose; fl. bright full golden-y. umbellate 2 or 3 together on slender ped. at the ends of the branches; outer row of ligules with a broad red stripe beneath, stigmas pale dusky olivaceous; ach. dark chestnut-brown muricately 10-ribbed, all attenuated into a long slender beak or pappus-stalk as long as or a little longer than themselves; pappus very fine soft silky w. protruding half the length of the pericline beyond it in the nearly ripe anthodia.—*Barkhausia laciniata* Prim. 25; DC.! vii. 154. *Crepis intybacea* Brot. Phyt. Lus. fasc. i. ed. 1 (1801) no. 12; ed. 2 (1816) i. 57, t. 26; ejusd. Fl. Lus. i. 321 (at least partly)? *C. Dioscoridis* and *C. biennis* Buch! 194. nos. 225 and 232 (not Linn.). *B. taraxacifolia* γ DC. l. c. (quoad saltem syn. Brot.)?—Herb. ann. Mad. reg. 1, 2, ccc. Vineyards and cult. ground, banks and roadsides everywhere most abundant about Funchal, the Mount, Curral das Freiras, P^to^ da Cruz. S^ta^ Anna, S. Vicente, &c. GD. reg. 2, r. Not seen in PS., ND., or SD. Jan.–June, and chiefly March, April, but here and there at most seasons.—Varr.:—

a. pinnatifida Prim. 26; DC. l. c.; l. and br. irregularly laciniato-pinnatifid, the lower l. runcinato-lyrate.—*C. biennis* Sol.! in BH. quoad spec. Mad. Masson (not Linn.); Buch! 194. no. 232. *C. Dioscoridis* var. cor. undique lutea Sol.! in BH. quoad spec. Mad. Masson (not Linn.); Buch! 194. no. 225 (partly).—About Funchal at P^to^ da Cruz, &c.

β. integrifolia Prim. 26; DC. l. c.; dwarfish; l. and br. all undivided, runcinately or repandly toothed, the lower hispid or strigulose on the midrib nerves and edges beneath, the upper or st.-l. quite smooth.—*C. Dioscoridis* var. foliis margine nudis Sol.! in BH. quoad spec. Mad. Masson (not Linn.); Buch! l. c. no. 225 (partly).—Mad. with *a*, but less common. GD. reg. 2, r.

Root simple tapshaped always ann. Pl. 1–3 or 4 ft. high somewhat succulent nearly or quite smooth and of a fresh bright shining mostly full dark gr., the l. often with a bright red or purple midrib. St. single stout solid erect, in *a* 1½–3 or 4 ft., in *β* 6–12 or 15 in. high, erectly but remotely fork-branched from the base throughout upwards, hard stiff smooth or very obscurely and irregularly minutely puberulous or glan-

dular, strongly ribbed or striated and angular, red or purple downwards. Branches erect remote elongate subcorymbose naked with an auriculate semiamplexicaul leafy br. at each fork, often in *a* laciniately pinnatifid, but sometimes, and in *β* always, acuminato-lanceolate, the uppermost being always finely linear and entire with the auriculate base only toothed. L. chiefly radical tufted, in *a* altogether smooth; in *β* with the midrib hispid or furry and the nerves and margins hispidulous beneath; the edges in all the l. being remotely and irregularly subciliately setoso-denticulate. Fl. about an in. in diam. umbellate in twos or threes at the ends of the branches, loosely corymbose, closing about noon; ped. and fl.-buds always erect forming a loose broad cyme, the former ebracteate long slender mealy-puberulous with sometimes 2 or 3 linear-filiform br. at top. Heads slightly mealy outside, inner scales about 15 twice or more the length of the outer loose calycle, gr. with a strong fleshy keel or midrib, very obtuse and prominent downwards and fringed or crested more or less with short conical or bulbous black soft spinules; outer scales of calycle lax unequal imbricate not spreading, lanceolate acute or subobtuse with discoloured ustulate or after flowering withered tips, a prominent gr. naked keel, and w. mealy membranous margins; all finely silky-w. inside. Tube of florets subpuberulous. Outer ligules mostly reddish towards the tips beneath. Ov. and its beak smooth. Ach. fusiform subcompressed attenuately longirostrate, their beak in all as long as or a little longer than themselves, ribbed and transversely rugulose, each with a little short pedic. which remains attached to the recept. Recept. alveolate, the edges of the cells fringed with short erect bristles. Pappus in the nearly ripe anthodia before expansion protruding half the length of the closed pericline above it in a thick close snow-w. tuft, copious. The long-beaked ach. or distinct pappus-stalk takes this pl. at once out of the category of *C. biennis* L., *nicæensis* Balb., *virens* L. (*C. tectorum* Sm.), *tectorum* L., &c. And from *C. taraxacifolia* Thuill., its nearest ally, it is constantly and at once distinguishable by its smooth shining full or dark gr. less finely divided foliage, &c.

C. intybacea Brot. ll. cc. is perhaps a mixture of it with *C. taraxacifolia* or something else with l. "utrinque hirsuta."

2. C. DIVARICATA Lowe. *Almeirante.*

Ann. or bienn. dwarfish succulent bright shining full gr.; st. short robust fork-branched smooth downwards, upwards with the divaricate ped. hispid glandulose; l. very smooth stiff rigid undulate crowded at the base or lower part of the st., the radical tufted or rosulate sinuato-runcinate, the st.-l. at the forks deflexedly caudato-acuminate subentire semiamplexicaul

and cordate at the base, produced into long entire conduplicate decurved points, the upper linear or auriculato-caudate; cyme small divaricately branched few-fld.; ped. rather short divaricate, thickly clothed or echinulato-hispid like the inner scales of the anthod. downwards with short black capitate setules or glandular pubescence, but otherwise naked or entirely ebracteate; scales of calycle lax, quite smooth like the upper halves of the inner, which are more than twice as long as the outer and densely glandular-hispid towards their base, with their edges or interstices slightly mealy-puberulous; fl. rather large somewhat dark golden-y.; heads in fr. ovato-ventricose; ach. dark-brown or black, all rather shortly attenuato-beaked, ribbed and transversely rugulose; pappus short scarcely longer than the inner scales of the pericline.—*Barkhausia divaricata* Prim. 26; DC.! vii. 157.—Herb. ann. or subbien. March–June. Varr. :—

a. robusta; st. single about a foot high erect virgate many-fld. leafy, lower l. runcinato-pinnatifid; outer scales of anthod. quite smooth.—*B. divaricata a* Lowe l. c.; DC.! l. c. *Crepis denticulata* Sol.! in BH.; Buch! 194. no. 226.—Mad. reg. 1, rrr. P^ta^ de S. Lourenço, only on the Ilheo dos Embarcadores, but there most abundantly; PS. reg. 1, r. Rib. do Cochim or Cochino near the town to the westward.

β. pumila; st. mostly several spreading few-fld.; l. undivided subentire much waved rigid stiff and fleshy thickly tufted; ped. and heads more hispid almost shaggy and more or less farinoso-puberulous, outer scales rarely subpubescent.—*B. divaricata* β Lowe l. c.; DC.! l. c.—PS. reg. 1 and lower part of 2, cc, in cornfields, waste ground and by roadsides all about the town, east, west, and north; ND. at top, ccc, abundant; GD. reg. 2, r, up the central valley sparingly; SD. reg. 2, rr.

Root stout simple fleshy fusiform. Foliage large and copious altogether smooth, of a peculiar bright yellowish apple-gr., and crisp or stiffish succulent substance. St. 6–12 in. high, never more than 12, in β much less, gr. stiff stout solid furrowed branched from the base, smooth below, sprinkled gradually more and more upwards with short minute bulbous blackish or atropurpureous glandular pubescence, sparingly fork-branched, with a narrow decurved producto-acuminate leaf at each fork. Lower l. forming a thick tuft at the crown of the root, the lowest in *a* sinuato-runcinate or pinnatifidly lyrate, the upper or st.-l. less divided and broadly dilated or auricled at the base, all but the lowest acuminate much waved and puckered. In β all the l. are mostly quite undivided or only occasionally gashed, and entire or shallowly and sharply recurvato-denticulate. Fl. of a rather darker golden-y. than usual, about an in. in diam. solitary on simple erect stiff ped., not thickened upwards but densely clothed with short black glandular pubescence, widely

divaricate, forming a loose few-fld. irregular cyme. Heads in bud oblong, in fl. slightly ventricose as in *Sonchus* at the base, more so in fr. and ovate, smooth at top, glandular-pubescent at the base. Outer scales of inv. (calycle) short not half the length of inner, quite smooth, linear-lanceolate, with black or purplish points and edges, at first close-pressed, but soon withering at the tips and becoming lax and spreading; inner scales 10–12 twice as long linear fleshy densely glandular-hispid at the base with short hairs like those of the ped., but not for the most part black or dark purple, with a few indistinct mealy whitish cottony hairs at their edges or interstices, but except in β scarcely enough to give any farinose appearance, quite smooth and shining upwards above their middle and nearly or quite smooth inside. The roughness or hairiness outside of the lower part of the inner scales appearing between the perfectly smooth outer scales, contrasts remarkably with the latter and with their own smooth upper portions. Heads in fr. considerably enlarged with the scales very fleshy; ovate, pointed, tipped with the slightly exserted pappus, swollen at the base. Ach. dark brown or black fusiform slender produced into a short slender beak, many-ribbed, the ribs minutely serrulate transversely. Pappus simple dirty or dull w. silky short but copious, rather shortly but distinctly stalked. Cells of recept. fimbriate.

The base of the glandular capitate hairs or setules is dilated longitudinally, like the prickle of a *Rosa* or *Rubus*, and on the st. and ped. is blackish or dark purple though the hairs themselves are not so always, and indeed, on the base of the inner scales of inv., are mostly altogether gr. or colourless.

This pl. is much sought after by the Machico people and brought over in boat-loads from the Ilheo dos Embarcadores on P^ta^ de São Lourenço in April and May to feed their pigs.

3. C. HIERACIOIDES Lowe.

Bienn. light apple-gr.; st. fistulose erect paniculately branched from the base upwards throughout with a single amplexicaul l. at each fork or division and at least upwards, together with the ped. and heads, more or less echinulato-hispid with short capitate black setules or hirtose with longer simple black spreading hairs or bristles; rarely nearly smooth or naked; l. smooth shining mostly undivided repandly sinuate-toothed or with waved shallowly repand-toothed or remotely setuloso-denticulate edges, rarely runcinato-pinnatifid, with the strong pale whitish midrib beneath more or less hirtose and the upper l. often fringed at the edges with black or purple bristly hairs or setules, the root-l. oblong-lanceolate much attenuated downwards, the st.-l. sessile amplexicaul

linear or ligulato-acuminate angulato-cordate or dilatato-subauriculate at the base; fl. numerous in terminal and lateral divaricately branched broad lax ample cymes, pale lemon-y.: heads mostly small or narrow and of somewhat few lax florets with the ligules often elongate and loosely spreading or subpendulous; ped. compressed at top with often 1 or 2 linear bractlets; scales of calycle short erect about $\frac{1}{3}$ length of inner, the ped. upwards and all the scales of inv. either hispid more or less with short black patent setules and w. cottony mealy pubescence or thickly shaggy-hirsute with long black or brown bristly hairs, quite smooth (not silky-w.) inside; ach. very dark brown elongated slender produced into a rather short or thickish beak much shorter than themselves, strongly ribbed, the ribs or their interstices finely crenulate; pappus short copious silky-w. not exserted beyond the tips of the inner scales of the pericline.—Herb. bien. Mad. reg. 1–3, $\frac{r}{2}$. May–Oct.

α. lævigata; heads and ped. glabrescent or sparingly hispid, sometimes nearly smooth and naked; flts. few lax with elongate subpendulous ligules.—*Barkhausia hieracioides* α, β Prim. 27. no. 44; DC.! vii. 157. *Crepis auriculata* Sol.! in BH.: Buch! 194. no. 224.—Mad. reg. 1, all along the N. coast from the Entrosa to Seixal, especially on wet banks and dripping rocks by waterfalls on the sea-cliffs at the Passo d'Area and between the Rib. do Inferno and Seixal.—A mere local form of β due to excessive moisture, with the foliage sometimes altogether smooth.

β. nigricans; heads and ped. densely hispid with black setules; flts. somewhat more close and numerous with the ligules less produced.—*Barkhausia dubia* Prim. 27. no. 45; DC.! vii. 157.—Mad. reg. 3, in most of the ravines of the N. above 2000 ft., e. g. in the Boa Ventura all about and below the Boca das Torrinhas; all down the Voltas from the Cruzinhas to Seixal; at the Rabaçal; head of the Rib. de João Delgada; Rib. de S. Jorge, da Metade, &c. The usual mountain and probably normal form of the sp.

γ. crinita; heads and ped. thickly shaggy-hirsute or bearded with copious long brown or blackish hairs; heads larger than in α and β.—*Barkhausia comata* Prim. 27. no. 46; DC.! vii. 157. *Crepis comata* Sol.! MSS. in BH.—Mad. reg. 3, rrr, an odd pl. only occasionally here and there; Boca das Torrinhas with β; "a single pl. on a very dry rock on the Encumeada alta, Pico Ruivo and Pico do Areeiro," S^r Moniz. Merely an extreme or perhaps monstrously developed state of β.

The discovery of numerous intermediate forms necessitates the fusion even of Solander's pl., together with my own two former sp., into one—though the shaggy bearded involucral

scales and ped. of extreme forms, such as the original type of *C. comata* in BH., give that var. a most distinct and peculiar aspect. It passes however gradually back through β, which seems to be the normal or average form of the sp., into the other almost eglandulose or comparatively denuded maritime state α,—the main distinctive characters of all three in common being the peculiar light shining apple-gr. foliage, the mostly low habit branched from the base, the mealy-cottony-puberulous ped. and inv., the peculiar deep-black setules or hairs, the pale or lemon-y. fl. and small narrow heads of few lax florets more like those of a *Hieracium* than of most *Crepides*. The l. vary from undivided to runcinato-pinnatifid in each of the three forms.

The following description, taken June 10th 1830, from pl. of β growing in my garden at the Valle, brought in the previous Sept. from high up the Rib. de S. Jorge, is here subjoined principally to help in forming a comparative opinion concerning the doubtful *C. andryaloides*:—

Root at least bienn. as thick as the forefinger, nearly simple tapshaped brown or whitish, 8 or 10 in. long wrinkled concentrically upwards. St. single about 2 ft. high fistulose stout erect very straight, slightly but very obtusely angular, even, thick in proportion to its side-branches which are produced all the way up from nearly the base, more or less bristly throughout with short distinct patent (not glandular) hairs or setæ, occasionally but rarely nearly smooth. From the shortness of the side-branches in proportion to the main st. and the wide-spreading lower l. the whole pl. forms an oblong or cylindric bush broad in proportion to its height. Side-branches erecto-patent slender subangular or striated leafy like the main st. to the top with a single leaf at each fork or axil and terminating like it in a loose subirregular cyme of from 3 to 6 or 8 fl., and hispid more and more upwards with short glandular black or blackish aculeiform setules. L. all of a peculiar pale bright yellowish gr. with a whitish conspicuous midrib and of a thin membranous substance, all quite smooth and shining except the midrib beneath in all and edges in the upper l. which are more or less sprinkled or fringed with hairs or setules. Root-l. in a radiating tuft elongate lanceolate-oblong acute much attenuated downwards into their petioles 6–12 in. long, 1–2 broad near the point; st.-l. oblong-acuminate cordate and half-amplexicaul at the base, one at each fork or axil, the upper gradually smaller and more linear, the margins of all except the

uppermost waved, shallowly runcinato-sinuate with more or less numerous intermediate unequal denticles or minute setaceous teeth, the uppermost entire but fringed with subulate denticles or short setules. Fl. paler y. and smaller than usual, about an inch in diam. Ped. divaricate slender a little thickened and mostly subcompressed close below the anthodium, naked or with only an occasional br. or two at top, densely clothed with short glandular black setules and slightly cottony with w. or mealy pubescence. Heads always narrow-oblong or cylindric, mealy and densely glandular-hairy at the base; calycle of about 6 unequal erect but lax or scarcely close-pressed scales linear-acuminate like the inner and about $\frac{1}{3}$ of their length, all quite smooth and naked inside, densely clothed outside with glandular hairs or setules (black or dark-coloured at the base) and more or less hoary with a thin mealy w. cottony tomentum. Flts. somewhat lax not very numerous. Ach. whilst young beakless or of equal diam. throughout, when ripe gradually attenuated into a beak $\frac{1}{3}$ of their whole length. Pappus scarcely longer than the ach., sessile at first, shortly stalked in the mature fr.

The Lanzarotan *Crepis Lowei β. canariensis* Schultz in WB. ii. 461, t. 123, a spec. of which, sent to me by Webb in Oct. 1829, I then *in litt.* wrongly referred to my *Barkhausia hieracioides*, is certainly a distinct sp. characterized by its entirely smooth st., ped. and midrib of l., its short ovate st.-l. broadly dilated at the base, and its densely setose-hispid heads ventricose in fr.—approaching indeed in this last point, as in its low leafy habit, *C. divaricata* rather than *C. hieracioides*. I found it not uncommonly from Jan. to Apr. on all the heights about Aria in the N. of Lanzarote in 1858 and 1859. There is also in BH. a spec. from Fuerteventura "ad rupes Tuineje," E. Bourg. Pl. Can. 1242.

4. C. ANDRYALOIDES Lowe.

Distinguished at once from the preceding sp., but almost solely, by its dark gr. l. all over glandular-hispid or pubescent, like those of *Thrincia hispida* Roth; in other respects much resembling *C. hieracioides*, of which it may very possibly prove to have been a mere chance hispid-leaved form or var. This must remain however undetermined for the present. For if on the one hand and in favour of its union with *C. hieracioides*, the sp. rests on a mere single individual, on the other hand its distinctness is supported by the facts that no ambiguous forms connecting it with that sp. have occurred, and that it grew and subsequently flowered side by side with pl. of var. *β* of that variable sp., each preserving its own peculiarities.—Prim. 25; DC.! vii. 164.—Herb. bienn. Mad. reg. 3, rrr. High up the

Rib. de S. Jorge, a little above the place where the stream fills up the whole breadth of the abruptly contracted ravine from rock to rock i. e. about half a mile above the subsequently discovered fossil-leaf-bed; a single pl., Sept. 17th 1829, growing with others of *C. hieracioides* β amongst loose rocks and stones in the bed of the ravine, with root-l. only. From this, transplanted into my garden in the Caminho do Valle, and flowering, all through May following, side by side with other pl. of *C. hieracioides* β brought from the same spot, the following description, written simultaneously with the preceding one of *C. hieracioides* β and under the full impression at the time of the two pl. being specifically different, is copied from my note-book :—

Root bienn. or at least hapaxanthous, long simple fusiform fleshy whitish. Whole pl. hispid. St. 2–3 ft. high erect straight solitary *branched upwards only above the middle* in a forked paniculate manner, hollow, *densely clothed throughout* with patent or slightly deflexed shortish glandular whitish hairs, whose base is often black or purplish and summit tipped with a w. globose gland. Lower and middle part of st. round and even (not ribbed or striated), branches and ped. angular or ribbed. L. shining *dark gr.*, their upper surface *hirsute or pubescent all over* and margins fringed with short unequal glandular hairs; beneath, the ribs only furnished with longer more copious hairs, leaving the interstices smooth and shining. Root-l. before the appearance of the fl. in a radical tuft, then withering, oblong, acute, 4 or 5 in. long, 1 in. broad, nearly entire, with fine subsetaceous distant shallow runcinate teeth, much resembling the l. of *Thrincia hispida* Roth. St.-l. sessile one at each fork of the branches semiamplexicaul cordato-angular but not eared or dilated at the base, oblong-acuminate, waved and subsinuate with distant shallow runcinate teeth; the uppermost linear-acuminate quite entire. Cyme spreading with distant forked striated or angular branches. Fl. distant rather large 1½ in. in diam., rather paler y. than usual. Ped. slender divaricate naked or with only 1 or two distant linear br., densely glandular-hairy. Heads slender oblong, in all stages densely hairy with blackish glandular hairs; calycle of about 6 erect not very close-pressed long linear acuminate scales, after flowering more lax but not at all spreading, densely bristly like the twice as long linear inner scales. Flts. few with rather lax and elongated ligules. Ach. (unripe) oblong or cylindric ribbed with very fine close transverse lines or granulations between the ribs, giving them a slightly scabrous appearance. Pappus simple pilose silky, perfectly sessile in the immature ach., as in other sp., in which nevertheless the ach. when ripe become beaked and the pappus stipitate. Recept. flat naked with the margin of its cells or pits membranous and shortly lacerato-fimbriate or bristly.

56. Andryala L.

1. A. cheiranthifolia Hérit.

Herb. ann. softly velvety-canescent fulvo-glandulous upwards; st. simple stiff straight erect branched at top only into a single terminal divaricately forked mostly spreading cyme: l. either undivided or (except the uppermost) variously sinuate-toothed or pinnatifid, their teeth, lobes, or laciniæ acute; root-l. numerous persistent crowded in a thick close tuft or rose; branches and ped. of cyme stout divaricate and with the rather large heads densely fulvo-villous or viscoso-glandulous; pappus mostly pure w., 4 or 5 times as long as the dark coffee-brown or black ach.—*A. varia* α, β, γ Lowe in litt. olim (1831–2); DC.! vii. 246. *Rothia cheiranthifolia* and *R. picroides* Rchb. in Höll's List.—Herb. ann. or only accidentally bienn. Mad. reg. 1, 2, 3, ccc; PS. 1, 4 chiefly, cc; ND. c; GD. cc; SD. $\frac{c}{2}$. Apr.–Oct.

α. *congesta* ("Bofe de Burro"); robust mostly dwarfish thickly leafy densely tomentose and fulvo-villous, viscous upwards: l. thickly crowded on the st. and cyme, ovato-lanceolate or lanceolate-acuminate mostly quite entire or only the lower pinnatifidly sinuate-toothed; cyme thickly leafy and fulvo-villous more or less congested with short thick ped. and branches and large crowded heads with short broad ligules.—*A. robusta* Novit. 540 or 18. *A. varia* β Lowe in litt. et MSS. olim (1831–2). *A. varia* v. *erecta* (tum *erecta* obliterata, et *A. cheiranthifolia* a Dryandro suprascripta) α, β, γ Sol.! in BH. and MSS. *A. varia* Buch! 194. no. 233.

Subv. 1. *latifolia*; lower l. broadly oval oblong entire or sometimes sinuato-pinnatifid; upper ovate or ovato-lanceolate abbreviate dilated at the base and subcordately semiamplexicaul; cyme densely and conspicuously leafy and thickly fulvo-villous, the heads large congested on short thick ped. and branches.—*A. cheiranthifolia* Pers. ii. 377 (not Hérit.). *A. varia* α. *candidissima* DC. l. c. *A. erecta* α. *albida fol. superioribus integris e lato basi lanceolatis: inferioribus pinnatifidis* Sol.! MSS. *A. erecta* MSS. α, Porto Santo Fr. Masson 1777 Sol.! in BH. *A. erecta* γ. *virescens fol. inferioribus subsinuatis* Sol.! MSS.: *A. erecta* MSS. γ *Hort. Kew.* Sol.! in BH. *A. integrifolia* Linn. Sp. 1136?; Desf. ii. 236??.—Mad. on P^ta^ de S. Lourenço, chiefly on the N. sea-cliffs. Ilheo dos Embarcadores and I. de Fora abundantly; S^ta^ Anna (S^r^ Moniz); P^to^ dos Frades in PS., passing into subv. 2; N., G. and S. Desertas, sea-cliffs. Entirely a maritime form of the sp.—A low bushy densely leafy very stout erect thickly and softly vel-

vety-tomentose pale hoary apple-gr. slightly viscous pl. about one foot high, thickly shortly and stiffly or condensedly branched at top only, forming a compact or close thickly leafy cyme clammy with y. or fulvous sometimes blackish glandular spreading hairs, copious on the st., branches, br. or floral l. and inv., but thinly sprinkled on the l. Root strong hard sparingly branched tortuous. L. densely crowded or congested in a large thick radical tuft, like those of *Matthiola maderensis* Lowe and closely imbricate or thickly clothing also both the st. and cyme; the lower 4 or 5 in. long, ¾–2 in. broad, mostly entire like the upper, but sometimes irregularly and more or less deeply sinuato-pinnatifid toothed or lobed, of a thick soft flaccid velvety substance, not elongate but broad comparatively with all the following varr. or forms of the sp., the lower broadly oblong, the upper 1–4 in. long, 1–3 in. broad, more or less broadly subovate or at least broadest or dilated and half-amplexicaul or subcordate at the base. Branches and ped. of the single terminal congested densely and conspicuously leafy cyme short thick robust, and, with the heads, densely fulvo-glandulose and woolly-tomentose. Fl. in large robust semi-globose short-stalked agglomerate or congested *Madia*-like heads, 6–8 lines in diam. with short broad oblong straight-sided 5-toothed ligules, 6 or 7 mill. long, 3 or 4 broad, not above ¼ diam. of disk, altogether plain full golden-y. Outer scales of inv. linear-lanceolate herbaceous thickly tomentose and fulvo-glandulose, the inner chaffy naked. Ach. all pappiferous, about 1 mill. long and half as broad, elliptic-oblong truncate at top with the w. or pale mammillate epigynous disk encircled with a ring of minute w. denticles (bases of the deciduous pappus) and an outer coronet of strong black teeth formed by the prominent ends of the 10 strong abrupt ribs which are of a somewhat reddish dark brown and quite smooth like their black interstices. Pappus copious short scarcely so long as the inv.-scales, soft sessile very caducous pure w. simply rough or denticulate upwards, shortly ciliate or hairy downwards. Recept. thinly hairy-setose, chaffy at the margin with the naked eglandulous inner scales of the inv. — This pl., differing strikingly from other forms at first sight in its low dwarfish robust bushy leafy habit, large broad oblong or ovate thick almost fleshy l., large globose crowded short-stalked fl.-heads congested on short robust thick ped. and branches into a close dense leafy cyme viscous with y. or fulvous or blackish copious glandular hairs, passes through subv. 2 by innumerable gradations or combinations of char. into the ordinary mountain states of var. β.

Subv. 2. *angustifolia* ("Cravo de Gado" PS.); like subv. 1, but l. all lanceolate-acuminate.—*A. varia* β. *angustifolia* DC.,

l. c. *A. erecta* β. *albida* fol. omnibus lanceolatis integris Sol. ! MSS.; *A. erecta* MSS. β, Madeira Fr. Masson 1777 Sol. ! in BH. *A. glandulosa* Lam. Dict. i. 154 ; Illust. t. 657. f. 1.—Mad. on P^ta^ de S. Lourenço here and there with subv. 1 ; "sea-cliffs at top beyond the Louros, S. Gonçallo" E. of Funchal, S^r^ Moniz, approaching in foliage the less tomentose sinuate-toothed forms of β, subv. 2 ; P^ta^ Ferrovo (S. Jorge) and elsewhere on the N. coast plentifully ; PS. reg. 4, on all the rocky peaks, especially on the N. side of the top of Pico do Castello, remote from the sea and 1400 ft. above it.

β. *sparsiflora* ; viscous and fulvo-villous upwards only ; l. all lanceolate-acuminate ; cyme compound, lax, stiffly spreading, widely fork-branched, inconspicuously leafy or merely bracteate at the forks, branches and ped. subelongate or slender, heads remote or distinct, ligules somewhat long and narrow.—*A. varia* α (subvarr. 1, 2) and γ (subvarr. 1, 2) Lowe in litt. et MSS. olim (1831–2). *A. varia* α, β and *A. crithmifolia* (not Ait.) Novit. 540 or 18. *A. varia* γ, δ, ε, ζ DC. ! vii. 246. *A. cheiranthifolia* Hérit., Spr. (not Pers.). *A. pinnatifida* and *A. denudata* Sol. ! in BH. ; Buch ! 194, nos. 235, 236. *Rothia cheiranthifolia* and ? *R. picroides* Reichenb. in Höll's List.—Mad. reg. 1–4, chiefly 2–4.

Subv. 1. *integrifolia* ; l. all undivided subentire or minutely remotely and inconspicuously repand-denticulate.—*A. varia* α (subv. 1, 2) Lowe in litt. et MSS. olim ; *A. varia* α Novit. l. c. ; *A. varia* γ, δ DC. ! l. c. *A. denudata* Sol. ! MSS. and BH. (Madeira Fr. Masson 1777) ; Buch ! 194. no. 236. *Rothia picroides* Rchb. in Höll's List ?—Rocks and dry rocky banks in Mad. everywhere, especially from 1500 to 5000 ft. ; about and above the Mount, in chestnut-woods about the Jardim, above P^to^ da Cruz, in the Serra d'Agua, Rib. de S^ta^ Luzia, Rib. Frio, da Metade, de S. Jorge, &c. ; S. Vicente from the beach or sea-cliffs upwards; at "Jardim do Mar and Rabaçal" S^r^ Moniz. June–Sept.—Varies in shady places or on moist rocks with l. more thin or membranous naked or glabrescently pale mealy greenish (var. α, subv. 1 *montana* Lowe in litt. et MSS. olim = var. γ. *subglabrata* DC. ! l. c. = *A. denudata* Sol. ! in BH. et MSS. and Buch ! ll. cc.), and on hot exposed dry rocks or at a lower elevation through innumerable intermediate gradations to more densely tomentose and hoary, the latter being var. α (subv. 2. *aprica*) Lowe in litt. et MSS. olim = var. δ. *aprica* DC. ! l. c. The seeds of the former of these two states, which is in fact the ordinary mountain form of the sp., cult. in England at Margate in 1830 by my friend the Rev. M. J. Berkeley, produced for the most part pl. with the more or less pinnatifid or sinuately inciso-toothed l. of the following subv. 2.

runcinata—corresponding thus precisely with Héritier's *A. cheiranthifolia*, which was figured from pl. raised in France or England from Mad. seeds.

Subv. 2. *runcinata*; l. runcinately sinuate-toothed or pinnatifid, the teeth or pinnæ spreading or recurved acute toothed or entire, the rachis leafy broader than the pinnæ.—*A. cheiranthifolia* Hérit. Stirp. Nov. 35, t. xviii.; Spr. iii. 633 (not. Pers.). *A. varia γ. cheiranthifolia* subv. 1 foliorum lobis abbreviatis subruncinatis Lowe in litt. et MSS. olim (1831–2). *A. varia β* Novit. l. c. *A. varia ε. cheiranthifolia* DC.! l. c. *A. pinnatifida α* (wholly) and *β* (partly) Sol.! MSS. and BH. (Madeira Fr. Masson 1777 and Hort. Kew. 1778); Ait. Hort. Kew. (ed. 1) iii. 129; Pers. ii. 377 (not Spr. or DC. and excl. habit. Canar.). *A. pinnatifida* Buch! 194. no. 235. *Rothia cheiranthifolia* Rchb. in Höll's List.—Mad. here and there occasionally with subv. 1; rocky banks about and above the Mount up to the Arrebentão, Rib. de S^ta Luzia, R. dos Soccorridos near São Martinho, and in the N. on a rock at the head of Rib. Fundo above the Lagoa or Fanal, &c. July–Aug.—Usually with thinly tomentose or mealy-naked l. varying much in their degree of decomposition: i. e. from merely sinuate-lobed or runcinate with shorter broader mostly entire lobes (=*A. pinnatifida β* Sol.! in BH.) to more deeply or completely pinnatifid with narrower ligulate or linear-acuminate laciniæ (=*A. pinnatifida α* Sol.! in BH.), blending thus into the following maritime state.

Obs. Solander constituted his *A. pinnatifida* var. *β* originally on a Mad. spec. (Fr. Masson 1777), still extant in BH., of the less deeply or finely pinnatifid state above referred to of the present subv. 2. He afterwards unfortunately referred to it a single sheet marked by him "*A. pinnatifida β* var. Teneriffe Fr. Masson 1778" which is the very distinct and purely Canarian (Tenerife, &c.) shrubby *A. pinnatifida* WB. ii. 412, t. 135; adding in darker ink "inter Rupes Insularum Canariensium ♄ Fr. Masson" to his original "Habitat in Maderæ locis graminosis." Hence not only *A. pinnatifida* Ait. *α* of the Hort. Kew. wholly, but *A. pinnatifida β* of the same work partly, and originally entirely, belongs to the Mad. and not to the Can. pl. The latter sp. has indeed such small pretensions to the name of *A. pinnatifida* Ait., and so much confusion is attached to its reception, that the adoption for it even now of a new name, *A. canariensis*, might be warrantable.

Subv. 3. *coronopifolia*; l. pinnatisect or subbipinnatifid, the

pinnæ or laciniæ narrow-ligulate or loriform elongate acute often here and there again toothed or divided, the rachis narrow linear not broader than the pinnæ.—*A. varia* γ. *cheiranthifolia*, subv. 2. *crithmifolia* Lowe in litt. et MSS. olim (1831–2). *A. varia* ζ? *crithmifolia* DC.! l. c. (excl. syn. Ait.). *A. crithmifolia* Novit. l. c. (not Ait.).—Mad. in one or two spots only; sea-cliffs at P^ta^ do Sol at the E. end of the beach, and at Magdalena on the tunnelled part of the sea-cliff road, to the westward beyond the Port. May-Oct.—In foliage this resembles the more finely divided-leaved states of *Plantago Coronopus* L. (as figured in EB. t. 892), or *Artemisia argentea* Hérit. or *A. gallica* Willd. (*A. maritima* EB. t. 1001), and thus so far resembles also very nearly *A. crithmifolia* Ait.; for which, indeed, till recently mistaking it, I sent it as a mere var. of *A. cheiranthifolia* or *varia* in 1832 to the late Chev. De Candolle. It is however merely an extreme maritime form of subv. 2 with more divided tomentose canescent l., but not presenting the other peculiar characters of the true *A. crithmifolia* Ait.

Compared as a whole with α. *congesta*, β. *sparsiflora* varies in all its forms or subvarr. like α in being more or less thinly mealy-tomentose i. e. greenish-naked or softly snowy-tomentose. It is a taller less robust or dwarfish pl., with an open free-branched ample lax or spreading cyme, and altogether less leafy than α, with the st.-l. more remote and those of the cyme narrow small remote and inconspicuous or reduced to mere bracts. Laciniæ of l. 2–2½, rachis 2–3 mill. broad. St. about 2 ft. or from 1 to 3 feet high, tomentose but without fulvous glandulous hairs like all the l. and br. except quite the uppermost. Heads smaller (4–5 lines in diam.), but fl. larger in diam. with longer narrower looser and more spreading ligules (7 or 8 mill. long, 2–3 broad) than in α. Scales of inv. fewer or more remote and distinct; in fr. not longer or a little shorter than the dirty-yellowish pappus.

A. cheiranthifolia, thus constituted after many years' observation, is assuredly one of the most variable of pl. Like Schultz in WB. ii. 414–418 in the case of his Can. *A. pinnatifida*, I can find no constancy in either the degree of pubescence or of decomposition or division of the l. taken apart. But combined with differences of habit, port, or stature, lax or congested inflorescence, size of heads, &c., each of these characters in turn helps to distinguish the foregoing subvarr. or forms. Combined or apart however, none of them possess stability enough to warrant the separation of even my own *A. robusta* as a sp.

Nothing short of a long and careful comparative study of numerous examples on both sides would justify at present the union of the Madeiran pl. with the European *A. sinuata* and *integrifolia* L. into one sp.,—though certainly an Algerian spec. in Herb. Linn., inscribed by Linnæus "*Andryala sinuata*," but with the numeral "1" prefixed, viz. that of his *A. integrifolia* Sp. Pl. 1136, with which it also best agrees in char., seems undistinguishable from the Mad. Pta de S. Lourenço *A. cheiranthifolia* α, subv. 1. Desfontaines's *A. integrifolia* (Fl. Atl. ii. 236) with a branched st., loosely corymbose pale y. fl. and fuscous ach., growing "in arvis" is however very doubtful.

2. A. CRITHMIFOLIA Ait.

Root and rootstock per. or subper. frutescent woody; st. ann. tall virgate with several elongate erect virgate side-branches, each like the main st. with a terminal cyme and rising corymbosely to the level of the main cyme, shortly or inconspicuously glandular-fulvescent upwards only, downwards like the foliage finely mealy-pubescent and pale greyish gr. or glaucous; l. finely multifid or capillary-decompound 2–3-pinnatipartite, the divisions all subspathulately capillary or linear-filiform elongate obtuse flaccid crowded intricate; cyme ample many-fld. spreading with long erecto-patent simple branches; heads and fl. small on very short ped. aggregate in small close terminal remote or distinct secondary cymes or clusters at the ends of the branches, the latter with the ped. and heads thickly but shortly fulvo-glandulous; ligules broad and short; pappus w. 4 or 5 times the length of the black pale-ribbed ach. —Ait.! Hort. Kew. iii. 129; Pers. ii. 377; Buch! 194. no. 234; Spr. iii. 663.—Herbaceo-frutescent per. Mad. reg. 1, rr. Sea-cliffs to the E. of Funchal at São Gonçallo, from a little beyond the Louros or Lazaretto nearly all the way along the edge or top to the Garajão or Brazen Head abundantly; first found by the late Dr. Chas. Lemann in 1837, and recently by Sr J. M. Moniz. May, June.—A very fine and well-marked sp., not less distinct in habit, stature, mode of growth and inflorescence than in foliage from every form of the preceding sp. Whole pl. pale bluish gr. canescent finely mealy rather than tomentose, fulvescent and shortly glandulous at top only. Rootstock frutescent woody, at least bienn. St. ann. 2–7 (mostly 5 or 6) ft. high and ½–1 in. in diam. at the base, hard firm and stiff but fistulose and herbaceous, dying down after flowering annually quite to the base, copiously leafy throughout but very crowdedly and densely downwards, and with its numerous long simple slender side-branches and cyme

also leafy; the l. all finely decompound like those of Fennel or of *Ammi Visnaga* (L.), the lowest most, the upper gradually less, the very uppermost only of the cyme becoming simply linear; the rachis and laciniæ almost capillary-linear, less or not more than one millim. wide, very narrowly and slenderly subspathulate, channelled or nerved above, convex or flattened beneath. Fl. small in little close cymose tufts or clusters at the ends of the long simple side-branches, which rising to the height of the main cyme form with it a large ample lax many-fld. corymbose panicle. Heads hemispherical compact 4–5 lines in diam. on very short stiff thickly fulvo-glandulous ped. 2–4 lines long; scales of inv. short narrow linear numerous close-set finely and shortly fulvo-tomentose or velvety. Ach. and pappus precisely as in *A. cheiranthifolia a*, subv. 1, *supra*. Recept. thinly sprinkled with long setose hairs.

The pl. sent by me to the late Chev. De Candolle in 1832 for *A. crithmifolia* Ait. was the P^{ta} do Sol var. *β*, subv. 3, of *A. cheiranthifolia* Hérit. *supra*; and it was accordingly correctly placed in the Prodr. under his or my *A. varia*. The late Dr. Chas. Lemann in 1837 first found the true *A. crithmifolia* Ait.; but I did not recognize it as such exclusively till very recently and on examination of the original type of Solander's (Aiton's) *A. crithmifolia* in BH., having previously called it, on its rediscovery by S^{r} Moniz in 1865 in Dr. Lemann's locality of 1837, *A. fœniculacea*.

††Order XLVIII. AMBROSIACEÆ.

The Burr-weed Family.

Fl. compound but flts. diclinous i. e. male and female in separate heads (anthodia) on the same pl. *Male flts.* aggregate numerous in each head; scales of inv. in a single row, distinct or concrete only at the base; cor. gamopetalous regular funnel-shaped 5-toothed; stam. 5, anthers free distinct simple at the base; style filiform simple, stigma entire, ovar. abortive. *Fem. flts.* single or geminate enclosed in a gamophyllous inv. of concrete scales forming a hard nutlike fr.; cor. and stam. 0, style cylindric bifid, the branches recurved with stigmatic edges, persistent and protruded in fr.; ovar. adnate 1-celled 1-ovulate. Ach. obovate without pappus enclosed in the hardened pericarp-like inv. Seed erect without albumen, embryo straight, the radicle directed towards the *hilum*.—

Coarse weedy herbs with inconspicuous fl. and no peculiar properties or uses.

††1. XANTHIUM. Male anthodia many-fld.; scales of inv. in a single row, *free*; recept. *chaffy*. Fem. anthodia 2-*fld.*, *cor. tubular-filiform.* Ach. 2 enclosed in the thickened indurated 2-celled inv. which is *shortly 2-beaked* and *clothed* with *hook-tipped spines.*—Erect branched herbs with coarse rough angular or lobed l.

††2. AMBROSIA. Male anthodia many-fld.; scales of inv. more or less *concrete* or combined into a shallow cup; recept. *naked.* Fem. anthodia 1-fld., *cor.* 0. Ach. single enclosed in the persistent inv. which is 2-beaked and encircled with *a ring* or coronet of short *straight spines* or points.—Erect herbs with divided compound pinnatisect l.

††1. XANTHIUM L.

††1. X. STRUMARIUM L. Burr-weed.

Unarmed; l. pedately nerved triangularly cordate irregularly angulato-lobed and toothed, shortly cuneate at the base and cut away to the two outer lateral nerves; heads crowded subsessile in short terminal or axillary more or less stalked rac., the male heads above the female; fr. erect or erecto-patent obovoidal or obovate attenuate at the base, shortly pubescent, beaks straight simple not hook-tipped, spines slender straight hooked at the tip and the length of half the diam. of the fr.—Linn. Sp. 1400; Vill. Dauph. iii. 38; Lam. Dict. iii. 412; Ill. t. 765. ff. 1. 2; Desf. ii. 343; Brot. i. 480; Pers. ii. 558; Buch 195. no. 272; EB. t. 2544; Sm. E. Fl. iv. 136; DC. v. 523; WB. ii. 241; Koch 531; Coss. et Germ. ii. 444; Bab. 208; Gren. et Godr. ii. 393; RFG. xix. 101, t. 215. f. ii.—Herb. ann. Mad. reg. 1, 2, r. Machico, roadsides and waste ground at the back of the beach; Terra Chão above P^to^ Moniz, roadsides and cornfields; "P^ta^ Delgada on the S. Vicente road," Dr. Lippold. July–Sept.—An erect branched shortly furry-pubescent dull gr. pl. 1–2 ft. high, with somewhat the habit or aspect of *Chenopodium Bonus Henricus* L. St. ribbed and angular, flexuous upwards, often dark reddish-brown. L. on long petioles about as long as themselves, angularly coarsely and irregularly lobed and toothed, 3–4 in. long and nearly or quite as broad at the base, subcordate shortly acuminate, soft flaccid and fast withering, strigosely rough or scabrous above, nearly smooth and paler beneath, pedately 3 or 5-nerved and cut away at the base to the 2 outer nerves as in *Lappa minor.* Rac. short flexuous; male heads superior rather numerous (10–15) globose or oval about 2 lines in diam., their inv. inconspicuous: fem. fl. fewer at the base of the rac. Fr. burr-like very hard

5 or 6 lines long, 3 or 4 broad, thickly clothed like the burr of a *Lappa* with quite straight spines one line long, hooked quite at the tip, but, as the hooks turn inwards, not prehensile; beaks distinct not contiguous or concrete, straight, but in drying they become incurved or forcipate. Ach. 2, 1 in each cell of the excessively hard woody ovoidal olive-shaped fr., much the size and shape of apple-pips, elliptic-oblong compressed tipped with the hardened pointed base of the style smooth glossy dark grey, finely multistriate longitudinally, 4 lines long, 2 broad.

††2. Ambrosia L.

††1. A. elatior L.

Finely striguloso-pubescent; st. erect simple virgate hard rigid leafy shortly and thinly tomentulose; petioles ciliate; l. solitary alternate stalked scabrous closely and minutely adpresso-strigulose, dark gr. above, paler and cinerascent beneath, loosely compound, the lower 2–3-pinnatipartite, the upper pinnatisect, the ultimate divisions lanceolate remotely gashed or toothed; heads in erect terminal and shorter axillary straight caudate or cylindric obtuse rac., the male superior numerous crowded stalked subpendulous ebracteate hemispherical many-fld., the female inferior and remote or lax sessile bracteate sometimes closely agglomerate in small axillary tufts without male fl., br. 2 or 3 ovate acuminate or lanceolate entire leafy, as long as or twice the length of the fr.; inv. of male fl. hypocrateriform entirely combined or 2–3-partite, the margin subcrenulate; fr. small hard obovate-urn-shaped irregularly tetragonal, crowned towards the top with an irregular circlet of 4–10 short erect conical pale points or spines; beaks straight simply pointed parallel and closely contiguous or often partly concrete into a pale single bifid beak the length of the style, with the 2 long filiform stigmas protruding from its apex.—Linn. Sp. 1401; Pers. ii. 558; Spr. iii. 852; DC. v. 526. —Herb. ann. Mad. reg. 2, rrr. Pta do Pargo in a single small plot of cult. ground about ¼ mile above the Church by the Vicar's watermill, a little to the left of the road to Fajãa d'Ovelha, plentifully and quite naturalized. July–Sept.—First discovered by Sr Moniz in 1861.—In habit and foliage a good deal resembling *Artemisia vulgaris* L. but wholly scentless. Root woody much branched or clothed with fibres. St. mostly single simple 1½–2 ft. high, slender but hard and firm straight ribbed or angular pale mostly reddish or purplish on one side, thinly clothed with fine short cottony pubescence, sometimes per. woody and bushy with many branches from the base. L. in outline ovato-lanceolate 2–6 in. long including the slender petiole, 1–4 broad, loosely or subremotely

2–3 composite with leafy membranous divisions, dark full gr. rough all over with short stiff strigose close-pressed hairs. Petioles fringed irregularly with long w. bristles. Rac. chiefly in bunches at the top of the st. about 2 in. long and $\frac{1}{4}$ in. broad; male fl. thickly crowded pale ochraceous, each head 15–20-fld. 3–4 mill. in diam. shortly but distinctly stalked, the saucer-shaped inv. leafy dark gr. subglabrescent ebracteate. Female fl. gr. with their spinous coronet and beaks pale straw-colour. Fr. hard but with its investing involucral coat thin and membranous, $3\frac{1}{2}$ mill. long (of which the beak is 1 mill.), $1\frac{3}{4}$ broad. Ach. single in each fr., $2\frac{1}{2}$ mill. long, $1\frac{3}{4}$ broad, hard black smooth rather shining obovate-urnshaped sharply but unequally 3–4-quetrous, abruptly rounded or subobtuse at top with a small prominent apicle or blunt point.

Order XLIX. CAMPANULACEÆ.

The Campanula or Hair-bell Family.

Fl. perfect irregular or regular. Cal.-tube adnate to the ov., limb superior free mostly 5-partite persistent. Cor. gamopetalous inserted at top of cal.-tube marcescent or persistent, limb 5-fid irregularly and bilabiately or regularly and stellately, the lobes alternate with the sep. valvate in bud. Stam. mostly 5 epigynous inserted with cor. at top of cal.-tube free from or only adnate to the cor. partially or at its base and alternate with its lobes; fil. or anth. more or less combined into a tube around the style or free; anth. 2-celled bursting longitudinally inwards. Style filiform. Caps. mostly 2–3- rarely 5-celled, crowned by the persistent or marcescent lobes of the cal. and cor., the cells many-seeded bursting either loculicidally from the top downwards, or opening at the top or sides by pores, valves, slits, or rarely transverse fissures. Embryo straight in a fleshy albumen; radicle near the hilum.—Herbaceous or suffrutescent acrid mostly milky pl. with alternate exstipulate l. and mostly conspicuous blue or w., rarely red or y. fl.

Tribe I. *LOBELIEÆ.*

Odd segment of cal. superior or anterior. Cor. irregular 1–2-labiate. Fil. often and anth. always combined or coherent; the 2 lower anth. and sometimes all bearded at top; pollen ovoidal. Style smooth fringed with hairs below the 2-lobed or undivided stigma. Caps. splitting loculicidally downwards at top.

1. Lobelia. Cal. 5-fid. Cor. tubular, tube split down on

the upperside, limb 5-fid 2-labiate, upper lip 2-, lower 3-fid. Stigma simple with a cup-shaped fringe or collar. Caps. 2–3-celled.—Fl. bl., w., v., or red.

Tribe II. *CAMPANULEÆ.*

Odd segm. of cal. inferior or posterior. Cor. regular rotate campanulate or tubular. Fil. and anth. free or anth. only partially combined; fil. mostly membranously dilated at the base; pollen spheroidal. Style pubescent; stigmas 2–3, rarely 5. Caps. opening by pores, valves or transverse clefts.—Fl. bl. or w., rarely lilac pink or y.

2. WAHLENBERGIA. Cal. 3–5-fid, tube obovoidal or obconic. Cor. campanulate 3–5-lobed. Stam. 3–5 free, fil. a little dilated at the base. Stigmas 2–5 short. Caps. oblong-ovoidal or subglobose partly superior, 2–5-celled, *opening loculicidally by valves at top above or within and opposite the cal.-lobes.*

3. CAMPANULA. Cal. 5-partite, tube mostly *short.* Cor. *campanulate* 5-lobed. Stam. 5 free, the fil. dilated and membranous at the base. Stigmas 3–5 filiform. Caps. *turbinate short* 3–5-celled *opening by* 3–5 *lateral pores below the segm. of the cal.*—Herbs mostly per. Fl. bl. or w., rarely violet, very rarely cream-col. or yellowish.

4. MUSSCHIA. Like *Campanula*, but cor. rotate or tubular deeply 5-partite and capsule *opening fenestrally by numerous transverse lateral slits or fissures between the nerves.* —Large robust long-leaved per. suffrutescent herbs, peculiar to Mad.! Fl. y. or fulvous.

5. SPECULARIA. Cal. 5-fid, tube *linear-oblong elongate prismatically* 3-*gonal.* Cor. *rotate* with 5 *flat spreading shallow* lobes. Stam. 5 free, the fil. short dilated at the base. Stigmas 3 filiform. Caps. *long linear-prismatic* 3-celled *opening by* 3 *lateral pores near the top.*—Small ann. herbs. Fl. bl. or violet.

6. TRACHELIUM. Like *Specularia*, but cor.-tube very slender, fil. of stam. long, style exserted, and caps. *spheroidal opening by three lateral pores at the base.*—Smooth per. herbs with numerous small corymbose dark bl. fl.

Tribe I. *Lobelieæ.*

1. Lobelia L.

1. L. urens L. *Cabreira.*

St. erect or ascending simple virgate or branched only at top into several long many-fl. rac. leafy, lower l. oval-oblong stalked faintly or repandly toothed or crenate, upper lanceolate sessile serrate; fl. in long terminal rac. simple or branched at the base, upper br. linear entire shorter than the fl.; pedic. shorter than the narrow cal.-tube, segm. of cal. linear-acuminate shorter than the funnel-shaped cor.-tube; lobes of cor. $\frac{2}{3}$ lanceolate subequal.—Linn. Sp. 1321; Lam. Dict. iii. 586; Brot. i. 304; Pers. ii. 213; Buch 194. no. 214; EB. t. 953; Sm. E. Fl. i. 298; Höll's List in Rat. Fl. and Hook. J. Bot. i.; DC. vii. 372; Coss. et Germ. ii. 351; Bab. 209; Gren. et Godr. ii. 396. *Rapuntium urens Soloniense* Bocc. Sic. 21, t. 11. f. iii., C, D, e, F. *Rapunculus galeatus*, &c., Moris. Hist. ii. 467. § 5, t. 5. f. 56.—Herb. per. or ann. Mad. reg. 2, 3, c. Chestnut-woods at the Mount, Jardim da Serra, S^ta^ Anna, S. Vicente, Prazeres, &c., and on moist banks or damp shady spots above 2000 ft. in all parts of the island; not seen in PS., the Desertas, Canaries or Cape Verdes. July–Oct.—Succulent bright shining full gr., 1–2 ft. high and in Mad. always quite smooth in all its parts. Lower l. $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. wide, subobtuse, attenuated at the base into short petioles. Rac. slender many-fld. elongate 6–12 or more in. long. Fl. more or less deep bl. small not above 6 or 7 lines long including their short pedic. Segm. of cor. deep bl., tube paler or lilac; anthers before bursting dark indigo-bl.

The whole pl. is very acrid and milky. No animals but goats will touch it; and to them it is said to be injurious.

Tribe II. *Campanuleæ.*

2. Wahlenbergia Schrad.

1. W. lobelioides (L.).

Smooth; st. with mostly numerous erect slender virgate leafless side-branches from the base or downwards rising to the height of the main-st.; l. confined to the lower parts of the st. or branches sharply toothed or serrate lanceolate, the lowest obovato-lanceolate, the upper reduced to inconspicuous linear minute br.; ped. subdichotomous filiform mostly elongate and curved or drooping; fl. numerous opening in long succession corymbose mostly cernuous in bud or fl., cor. funnel-shaped,

the tube obconic short not longer than the cal.-lobes, limb 3–5-fid, stigmas 2; caps. erect ovoidal subcylindric, seeds ovoidal.—DC. vii. 440; J. A. Schm. Fl. Verd. 207; *W. lobelioides β. Linnæi* WB. iii. 4. "*W. pendula* Schrad." *Campanula lobelioides* Linn. fil. "Suppl. 140;" Hort. Kew. (ed. 2) i. 345; Lam. Dict. i. 590; Suppl. ii. 61; Pers. i. 189; Spr. i. 736: Buch 194. no. 211. *C. inconspicua* Sol. MSS. in BH. "*C. parviflora* Salisb. Prodr. 126." "*Roella cernua* Brouss." "*Lobelia Broussonetia* Bory."—Herb. ann. Mad. reg. 1, 2, c; PS. reg. 4, c; ND., GD., SD. reg. 2, c or $\frac{c}{2}$. Dry rocks, banks, walls and beds of ravines in Mad. everywhere; Rib. de S^{ta} Luzia, the Brazen Head, Camacha, &c.; rocky summits of all the hills in PS.; general in the Desertas and varying with w. fl. on the tops of the hills towards the S. of GD. Apr.–June.—Root w. fleshy nearly simple or tap-shaped. Whole pl. smooth and shining 6–12 or 15 in. high, milky. L. bright gr. shining somewhat stiff or fleshy 1–2 in. long and $\frac{1}{4}$–$\frac{1}{2}$ in. broad, crowded towards the base of the st. which is mostly many-branched and bushy from the base. Fl. in a proliferous repeatedly forked erectly branched cyme, small and inconspicuous but elegant, pale v.-blue or lilac sometimes pink or rose-colour, rarely w.; cor. twice or nearly twice the length of ov. and cal. mostly 5-fid, the smaller lateral fl. 3 or 4-fid. Stigmas 2 large. Capsule 2–3 lines long, 1–1$\frac{1}{2}$ broad, 2-celled bursting at top within the dark gr. or purplish cal.-teeth. Seeds numerous small.

3. Campanula L.

1. C. Erinus L.

Ann. hispid; st. low often bushy, dichotomously branched upwards; l. oblong or oval-oblong coarsely toothed, wedge-shaped and entire at the base, the lower spathulate stalked, the upper ovate or oval opposite sessile 3-fid; fl. very shortly stalked subsessile solitary in the forks and agglomerate in little short leafy rac., heads, or clusters, at the ends of the branches, forming an irregular lax dichotomous or divaricately forked cyme; cal.-tube very short shallowly or flatly turbinate, the segm. leafy exappendiculate lanceolate, spreading and triangular in fr.; cor. small campanulato-tubular scarcely longer than the cal.-segm.; caps. nutant turbinato-discoidal indehiscent or finally bursting towards the base.—Linn. Sp. 240: Vill. Dauph. ii. 514; Lam. Dict. i. 585; Desf. i. 181; Brot. i. 287; Pers. i. 191; Ait. Hort. Kew. (ed. 2) i. 353; Fl. Gr. t. 214; Buch 194. no. 213; Spr. i. 736; DC. vii. 473; WB. iii. 8; Koch 539; Seub. Fl. Az. 34; Gren. et Godr. ii. 412; RFG. xix. 114, t. 246. f. i. *Rapunculus minor foliis incisis* &c., Moris. ii. 458. § 5, t. 3. f. 25.—Herb. ann. Mad. reg. 1–4, ccc; PS. reg. 2, $\frac{r}{2}$; GD. reg. 2, r. On rocks and walls everywhere

in Mad. from the sea to the tops of the highest peaks, Funchal, Machico, P^to^ da Cruz, S. Vicente, &c.; PS. in cornfields and by roadsides; GD. only on the highest peaks. March–July.—A low leafy mostly bushy dull dark gr. or greyish pl. 4–6 or 8 in. high, with the aspect (as Villars has remarked) of some ann. *Veronica* (*V. agrestis* or *hederifolia* or *arvensis* L.) rather than of a *Campanula*. Root small white branched only downwards. St. erect or diffuse simple below or with several ascending side-branches from the base, widely and regularly fork-branched upwards, the branches stiff but slender. L. $\frac{1}{2}$–$\frac{3}{4}$ in. long, the lower spathulate aad attenuated at the base into a petiole, the upper broader and shorter more or less obovate or oval and sessile, all deeply or coarsely and bluntly 3–6 or 8-toothed. Fl. small and inconspicuous numerous nearly sessile on very short ped. mostly solitary in the forks between 2 l., rarely oppositifolious; cor.-tube w. cylindric equal, lobes 5 light bl. equal ovate obtuse reaching beyond those of the cal. which are lanceolate and suberect in fl., broader or triangular and spreading horizontally in fr. Caps. small nodding or turned to one side shallow-turbinate and flattened above, 3-celled, mostly indehiscent. Seeds small oblong subpellucid brown and shining.

4. Musschia Dumort.

1. M. aurea (L. fil.).

Herb. stemless or subcaulescent, *wholly smooth and shining;* l. in radical or terminal tufts elliptic or elliptic-oblong sometimes elongato-lanceolate, *broadest in the middle* equally pointed at each end, the lower attenuated at the base into distinct petioles, *all coriaceous' very smooth and shining*, finely and sharply subduplicato-serrulate, the uppermost or fl.-br. subentire; fl. erect cymoso-paniculate, panicle terminal short triangular leafy candelabriform, cymes 2–3-fld. at the ends of the spreading or declining side-branches or their subdivisions; br. *conspicuous leafy oblong-lanceolate*; cal. *coloured*, its lobes erect *ovate as long as the short* linear-lanceolate spreading or reflexed lobes of the cor.—DC. vii. 495. *Campanula aurea* Linn. fil. "Suppl. 141;" Lam. Dict. i. 590; Suppl. ii. 59; Pers. i. 192; Venten. Malm. 116; Ait. Hort. Kew. (ed. 2) i. 351; Buch! 194. no. 212; Bot. Reg. i. t. 57; Spr. Syst. i. 728.—Herb. per. Mad. reg. 1 (sea-cliffs) chiefly, but running up ravines to reg. 3, r or $\frac{r}{2}$. Cliffs at the back of the Praia formosa near Funchal; "S. Gonçallo," S^r^ Moniz; sea-cliffs all along the S. coast to the W. of Funchal here and there abundantly, and in the N. above P^ta^ Delgada. July–Sept.—Root thick fleshy striking deep into the fissures of perpendicular dry sunny rocks. St. originally none, but in the course of years the short fleshy

root-stock becomes lengthened into one or more thick rugged naked straggling st. 2 or 3–10 or 12 in. long and ¼–½ in. in diam., fleshy very brittle and milky, simple or rarely divided, with a terminal tuft of l. from the centre of which proceeds the ann. fl. st. and below which it is pale brown scarred and rugged. Foliage dark but very bright shining gr. as if varnished. Root-l. 5 or 6 in. long and 3–3½ wide in the usual sea-cliff pl.; in the narrow-leaved form (β. *angustifolia* DC.) from mostly higher elevations or remote from the sea, 6–12 in. long, 1–1½ wide, attenuated downwards into distinct narrow-winged petioles ½–2 in. long; the upper or floral l. sessile; the midrib and nerves pale whitish like the tips of the sphacelate callous teeth. Panicle 6–12 in. high erect shortly pyramidal candelabra-like with a sessile lanceolate more or less entire l. at each subdivision, the branches stiff straight widely patent round or subcompressed bright yellowish gr. Fl. most elegant and singular, scentless, about an inch long, a mixture of gr. and golden y., essentially erect, those of the mostly 3-fld. side-branches becoming so by an abrupt curve or flexure of the pedic. close below the fl.; the terminal fl. opening a little before the others. Cal.-tube obconic 5-gonal with 5 strong intermediate ribs, and like the upper part of the pedic. of a full bright golden y.; the lobes ½–¾ in. long, 3–4 lines broad, in all stages erect, flat or slightly concave outwardly, their tips or margins slightly recurved and gr., the rest i. e. base, middle, midrib and veins, bright golden-y. Cor. paler y. than the cal., its tube slender narrow ¼ in. long, the lobes narrow linear-lanceolate acuminate, 8 or 9 lines long, 2 broad, horizontally patent or reflexed between the cal.-lobes, forming before expansion an erect obtusely 5-gonal pyramidal tube far within the cal.-lobes, each with a little prominent tooth at the base between the divisions. Stam. about the length of the style, with slender flaccid fil.; anth. oblong mucronate brown discharging in the bud their globose y. pollen before the expansion of the cor. Style thickish and roundish subquinquangular greenish upwards, shorter than the lobes of the cor.; stigmas stellately radiant or subrecurved linear flattened greenish, 4 or 5 lines long, erect in bud. The lateral fl. have sometimes only 4 stam. and stigmas; and more rarely 2 of the cal.-lobes are partly coherent. Caps. pentagonally obconic, bursting only by the decay or contraction of the parenchyma between the nerves or ribs, like the openings of a Venetian blind. Seeds small ovoidal.

β. *angustifolia* DC. l. c. is merely an occasional longer- or narrower-leaved form, growing remote from the sea at higher elevations, e. g. Rib. de S^{ta} Luzia, 3000 ft., about half a mile below the Waterfall; Curral das Freiras, S^{r} Moniz.

Had this pl. grown in Italy, it might well be supposed to have suggested the idea of the famous golden branch of the Cumæan Sybil to the Roman poet :—

> "Discolor unde auri per ramos aura refulsit,
> Quale solet silvis brumali frigore viscum
> Fronde virere nova quod non sua seminat arbos,
> Et croceo fætu teretes circumdare truncos.
> Talis erat speeies auri frondentis opaca
> Ilice, sic leni crepitabat bractea vento."
>
> Æneid. vi. 204–209.

Nothing can indeed exceed the singularity and splendour of a fine panicle as it occurs in Mad. on its native rocks, almost wholly of a rich golden-y., and shining as if varnished, in full contrast with the equally bright shining dark-gr. foliage. The whole pl. abounds in a thick viscid mild or tasteless milky juice.

2. M. Wollastoni Lowe. *Tanjerão brava* at Seixal.

Shrubby erect furry-pubescent, st. simple or sparingly branched, branches thick stout woody and naked downwards; l. in terminal radiant tufts elongate obovate-oblong *broadest above the middle* acute contracted downwards sessile and either abrupt or subdecurrent at the base, *thin flaccid membranous*, finely sharply and regularly duplicato-serrate, *furry-pubescent* particularly on the nerves and midrib and especially beneath; fl. erect cymose in an elongated pyramidal naked or inconspicuously leafy-bracteate terminal panicle, cymes 1–3-fl. at the ends of the straight stiff horizontal or declining side-branches or their subdivisions; br. *inconspicuous small lanceolate or linear-lanceolate*; cal.-lobes erect *linear-lanceolate much shorter than the long* linear-ligulate spreading or reflexed lobes of the cor. —Lowe in Hook. J. of Bot. viii. 298; Johns. l. c. ix. 164; BM. t. 5606 (a pale greenish-y. fl. state or var.).—Shr. per. Mad. reg. 3, rr. Dark moist shady banks or gleus along the Levada in the Rib. da Metade and more plentifully all down the Boa Ventura below the Boca das Torrinhas for 2 or 3 miles, up all the streams descending from the Pico Jorge. "Serra de S. Jorge and Rib. do Seixal," S^r^ Moniz; "Ribeiras below the Encumeada de S. Vicente, Rib. do Inferno, most of the Seixal Ravines, and at the Serra d'Agua (Seixal) not more than 600 ft. above the sea," Mr. Mason. Aug., Sept.—A remotely or sparingly branched shr. with the habit of *Sonchus fruticosus* L. fil. and foliage of *Isopleuris Sceptrum* (L.). St. often simple and from 2–5 or 6 ft. long, naked with a single terminal radiating tuft of l., at most with only 2 or 3 remote

simple branches each similarly crowned with l., round smooth and even, with a pale ash-cold. bark, perfectly woody and naked below the l., while young pubescent, ½–1 in. in diam. L. 1–2 ft. long, 3–5 or 6 in. broad, thin soft and membranous, light apple-gr., mostly more or less purplish, paler but not whitish beneath, the midrib pale straw-col. subsuccnlent and with the nerves almost hirsute beneath. Panicle from the centre of the terminal tufts of l., 1½–3 ft. long, naked or inconspicuously leafy, subremotely branched and flowered, the branches widely straightly and stiffly divaricate 1–3-fl. Fl. large but not very conspicuous, 1½–2 in. long, erect not cernuous, scentless. Cal. large pubescent or furry like the whole panicle, tube 5-angular strongly 10-ribbed obconic ; lobes permanently erect, twice as long as the tube yet only reaching a little beyond the top of the cor.-tube and only half the length of the cor., the whole of a dull dark brownish gr. or purple ; the sinuses simple exappendiculate. Cor. dull ochre-y. tinged tipped or streaked with dull red giving it somewhat of a purpurascent orange or lateritious tint like *Canarina Campanula* L. or *Isoplexis Sceptrum* (L.) ; tube a little shorter than the cal.-lobes narrow slender straight cylindric strongly ribbed, a little swollen at the base ; lobes 1 in. long $\frac{1}{10}$ in. broad, linear subcanaliculate, rather longer than and reflexed between the cal.-lobes, but reaching about an inch beyond their tips. Anth. linear straight cuspidate, about half the length of the cor.-lobes and rather shorter than their own free very slender fil., which are quite smooth and dilated at the base. Stigma very large deeply 5-cleft, the divisions ½ in. long spreading or revolute, the style exserted ½ in. beyond the cor.-tube : the whole, like the cor. outwardly, pubescent. Caps., like those of *M. aurea*, bursting by transverse slits between the nerves or ribs, but semiglobose rather than obconic. Seeds minute (1 mill. long, ½ mill. broad) oblong compressed tawny or yellowish-brown not shining but minutely rough.

Though not equalling *M. aurea* in the brilliancy and beauty of its fl., *M. Wollastoni* is in stature and in foliage a truly noble pl.

The beautiful figure of it in BM. t. 5606 with pale greenish-y. fl., recals the poet's warning "Nimium ne crede colori" in the case of cult. pl. Nothing like it in this respect has occurred in Mad.

5. Specularia Heist.

1. S. falcata (Ten.).

More or less scabrous rarely smooth ; st. slender virgate mostly simple sometimes slenderly and shortly branched down-

wards; fl. axillary sessile remote in a long spike or at theend s of the short side-branches, mostly solitary, rarely 2–3-nate; lobes of cal. linear finely acuminate falcately spreading or recurved nearly or quite as long as the cal.-tube or ov. and from about as long to nearly twice as long as the cor. but rarely more than half the length of the ripe caps.; seeds lenticular rounded or rounded-oval.—DC. vii. 489; WB. iii. 6; Koch 544; Gren. et Godr. ii. 405. *Prismatocarpus falcatus* Ten. "Prodr. 16; Fl. Nap. i. 77, t. 20." *Campanula falcata* R. et Sch., Spr. i. 737; "Guss. Pl. Sic. Prod. i. 247."

β. scabra DC! l. c.; very scabrous almost furry, cal.-lobes scarcely longer than the cor.—*Prismatocarpus scaber* Lowe Novit. 538 or 16.—Herb. ann. Mad. reg. 2, rrr. Curral dos Romeiros, nearly at the bottom descending from the Mount, on a dry bank on the left hand a little before reaching the bridge; top of Cabo Girão "and from thence towards Pico do Cedro in the Curral das Freiras," Capt. Norman; S. Vicente, rocks 1500 ft. above the church on the W. side; "Rib. de S^{ta} Luzia, São Gonçallo, and Levada do Bom Successo, Funchal," S^{r} Moniz. May, June.—Root small w. slender fibrous strongly fetid. St. a foot high or more, abruptly bent and ascending at the base, then straight and stiffly erect, strongly 4-angular, slender. Whole pl. harsh roughly furry-scabrous pale dull greyish-gr. Lower or root-l. stalked rounded or spathulate crenate, the rest sessile lanceolate more entire, all small and inconspicuous. Terminal fl. larger and more conspicuous than the rest, cor. light v. or purplish bl., sometimes "pink" (Capt. Norman), its throat yellowish-w., ¾ in. in diam. lobes 5 lines long, 2 broad, lanceolate, at first opening a little shorter but afterwards a little longer than the finely narrow falcate lobes of cal.; style and trifid stigma pale v. about half the length of cor. Side-fl. with the cor. shorter and altogether smaller. Caps. 6–8 or 9 lines long, about 1 line broad, strongly and deeply 3-ribbed or grooved, linear-subclavate, a little contracted but not narrowly constricted at top close below the cal.-lobes, attenuated downwards. Seeds 1 millim. long, very bright shining chestnut.

The name *Prismatocarpus* is now confined to the Cape sp., distinguished from the European by having only 2 stigmas, a 2-celled ov. and caps., the latter splitting down from top to bottom ultimately into 5 laciniæ.

†2. S. HYBRIDA (L.).

Partially or slightly scabrous, st. mostly simple virgate; fl. corymbosely agglomerate or approximate at the ends of the st.

or branches, inconspicuous; cal.-lobes shortly lanceolate or ovato-lanceolate erect about half as long as the cal.-tube or ov. and twice as long as the cor. but only from $\frac{1}{3}$ to $\frac{1}{2}$ the length of the ripe fr.; caps. linear-oblong constricted at top, seeds oblong, oval, or elliptic.—DC. vii. 490; WB. iii. 6; Koch 544; Coss. et Germ. 349; Gren. et Godr. ii. 405; Bab. 211. *Campanula hybrida*, Linn. Sp. 239; Vill. Dauph. ii. 514; Lam. Dict. i. 589; EB. t. 375; Desf. i. 180; Brot. i. 287; Pers. i. 193; Ait. Hort. Kew. (ed. 2) i. 352; Sm. E. Fl. i. 293; Spr. i. 737. *Prismatocarpus hybridus* Hérit., *P. confertus* Mnch. and *Campan. spuria* Pall. (ex DC.). *Camp. arvensis erecta* Moris. Hist. ii. 457. § 5, t. 2. f. 22.—Herb. ann. Mad. reg. 2, rrr. "Borders of cornfields on the Cabo Girão," Capt. Norman; "Pico de S. Gonçallo," S^{r} Moniz. May, June.—A smaller stouter or thicker-stemmed more leafy or broadly leafy pl. than *S. falcata*, not more than 6 or 8 in. high, of a pale greyish gr. L. strongly waved and crenate at the edges, the lower spathulate and stalked, the upper broadly subspathulately oblong sessile. Fl. crowded towards the tops of the st. or branches in fascicles of 2 or 3, or solitary at the ends of short side-branches, very inconspicuous; cor. b. small and insignificant often scarcely opening and subabortive; cal.-lobes leafy $2\frac{1}{2}$ lines long, always erect, subciliato-scabrous at the edges. Caps. shorter and thicker than in *S. falcata*, 6–8 or 9 lines long, $1\frac{1}{2}$ broad, less attenuated downwards and distinctly constricted into a short narrow neck at top close below the cal.-lobes. Seeds 1 mill. long, all elliptic-oblong, bright shining chestnut.

††6. Trachelium L.

††1. T. cæruleum L.

L. ovate or lanceolate or elliptic-oblong, acute at each end, petiolate, sharply serrate; cor. deep steelly or v.-b., limb salver- or funnel-shaped, tube long filiform fine and slender; caps. 3-celled.—Linn. Sp. 243; Lam. Dict. vii. 721, Illustr. t. 126; Desf. i. 182; Pers. i. 195; Ait. Hort. Kew. (ed. 2) i. 355; Bot. Reg. t. 72; Spr. i. 738; DC. vii. 491. *Rapunculus corniculatus valerianoides cæruleus* Moris. Hist. ii. 465. § 5, t. 5. f. 52. *Valeriana cærulea urticæ folio* Barr. Ic. 683, 684.—Herb. per. Mad. reg. 1, rrr. In several gardens in and about Funchal quite a weed, and perfectly naturalized on the river-wall of the Rib. de S^{ta} Luzia under the house of the late Mr. Consul Veitch. Introd. about 1840. June, July.—Root or rootstock large tuberous. St. several 1–2 or 3 ft. high erect leafy, suffrutescent downwards, hard but slender, quite smooth like the whole pl. L. dark full gr., sometimes like the st. v. or purple ovate (1–2 in. long and $\frac{1}{2}$–1 in. broad) or lanceolate (1–2 in.

long and $\frac{1}{4}$–$\frac{1}{2}$ in. broad), sometimes more deeply or coarsely sometimes finely serrate, all distinctly stalked, petioles fine and slender. Fl. minute deep v. or steelly b. in dense terminal globose or semiglobose cymes, except in col. closely resembling those of *Valeriana rubra* L. Cal. minute with 5 short linear teeth, the whole only 1 mill. long. Cor. small and slender 3 or 4 lines long; the tube very finely filiform or capillary, limb minute in 5 short lanceolate or elliptic lobes scarcely more than $\frac{1}{2}$ line long. Style far exserted finely filiform, as long as the cor., with a capitate minute 3-lobed stigma.

Order L. VACCINIACEÆ.

The Whortleberry Family.

Fl. perfect regular.—Cal.-tube adnate to the ov., limb superior free 4–6-lobed. Cor. gamopetalous inserted at top of cal.-tube 4–6-fid caducous, the lobes or divisions alternate with those of the cal., imbricate in bud. Stam. twice as many as the lobes of cal. or cor., in a single row, calycifloral or free and inserted with cor. on an epigynous or perigynous disk at top of cal.-tube or base of its limb, not epipetalous or adnate to the cor.; fil. free or rarely united or monadelphous; anth. free terminal vertical 2-celled, the cells distinct upwards and produced at top into 2 hornlike tubes, each ending in an orifice or pore. Ov. inferior, crowned by the persistent cal.-limb in fr., 4–10-celled and composed of 4–10 multiovulate carpels alternate with the cal.-lobes; style single, stigma mostly capitate. Fr. berry-like juicy or fleshy. Seeds small numerous, embryo minute with fleshy albumen.—Shr. with slightly bitter subastringent watery not milky juices, simple alternate whorled or opposite exstipulate mostly coriaceous evergreen l. and racemose or solitary fl. mostly red or greenish. Fr. edible acid subastringent cooling disinfectant antiscorbutic.

1. VACCINIUM. Cal. 4–5-lobed, lobes short tooth-like, sometimes obsolete. Cor. urceolate or campanulate sometimes cylindric, 4–5-lobed or toothed. Stam. 8–10. Berry globose 4–5-celled many-seeded.—Erect, shr.

1. V. MADERENSE Link. *Uveira* (tr.), *Uva da Serra* (fr.).

Shr. or subarborescent, mostly evergreen; l. coriaceous not deciduous, oblong or lanceolate acute at each end, finely serrulate, the midrib pubescent at the base beneath like the short petioles and young shoots, all the rest smooth; fl. drooping in leafy-bracteate rac. below the leafy ends of the branches; cor. globoso-campanulate or ovoidal not more than twice the length of cal., anthers awnless, style scarcely exserted, about the

length of the cor.; cal.-lobes distinct acute.—Link. "Enum. Hort. Berl. i. 374;" Spr. ii. 209; DC. vii. 567. *V. Arctostaphylos* "Willd. Sp. ii. 353; Andr. Bot. Rep. t. 30" (sec. DC.); Pers. i. 480 (partly); BM. t. 974; Buch 194. no. 210 (not Linn.). *V. padifolium* Sm. in Rees Cyclop. "no. 22."—Shr. per. Mad. reg. 3, cc. Everywhere on the open mountains and in wooded ravines; above the Mount Church, in Rib. Frio, above S^ta^ Anna, S. Jorge, S. Vicente, P^to^ da Cruz, at S. Ant^o^ da Serra, &c. May–Aug.—A shr. from 4 or 5 to 15 or 20 ft. high; in open spots thickly bushy with very numerous erect straight st. $\frac{1}{2}$–$\frac{3}{4}$ in. in diam.; in more sheltered places, or in woods of other tr., more loosely branched and tree-like, with st. 1–2 in. in diam.; the wood hard, the bark smooth and pale or whitish on the st. and older branches, which are also much infested with Lichens, Jungermannias and Mosses, and reddish or purplish brown on the newer shoots or twigs. L. changing to a rich russet red or red Russia-leather colour in the winter or early spring, otherwise dark full gr., shining smooth except the midrib beneath, finely reticulate and serrulate, $1\frac{1}{4}$–2 in. (mostly $1\frac{1}{2}$) long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad, stiff coriaceous with very short pubescent petioles. Fl. numerous in erect leafy-bracteate rac. mostly from the last year's wood close below the new leafy shoots; br. leafy conspicuous oval or roundish thin and membranous caducous, the larger 3 or 4 lines long or broad. Ped. curved slender smooth. Cal. gr. or red on upper side, its 5 lobes broadly and shortly half-ovate acute or subapiculate. Cor. 3–5 lines long, nearly as broad, with 5 broad shallow recurved or reflexed lobes, pale waxy gr. or yellowish, tinged on the upperside with more or less deep (Russia-leather) red, rose, or flesh-colour; anthers included; style simple, only just its tip exserted. Fr. oval or oblongo-globose, broadly truncato-umbilicate at top dark shining purplish black with or without bloom, 4–6 lines long, 3–4 or 5 broad, mostly larger than those of *V. myrtillus* L. (Bilberries) and with a finer acid flavour. Seeds small brown angular beautifully reticulated.

Strictly confined to Mad. *proper*, where it forms close thickets of vast extent in all the upper parts of the island from about 2000 to 5000 ft., scarcely thriving either above or below these elevations and growing in greatest luxuriance at about 4000 ft. In the exposed parts of the mountains, it becomes stripped in winter of nearly all its l.; but in more sheltered spots they hang on, changed to a rich russet-red, or, before falling, often to a brilliant scarlet or crimson, till the fresh bright gr. young l. appear in April or May—the peculiar Russia-leather redness of the foliage in the winter and to the end of March giving to

whole mountain-tracts a remarkable and striking aspect. Vast quantities of the root-stocks, or st. cut up from the roots, are brought down daily into Funchal and all the villages of the island for fuel or brush-wood; and the taller st., 8–10 ft. long or more, are now much used as rods or poles (*varas*) for French Beans (*Feijoens*) *Phaseolus vulgaris* L., in default of the more durable Heath-poles which are yearly becoming scarcer. The fr. is also in much request for making a conserve or jelly, being a favourite and wholesome remedy in colds or coughs, and, mixed with sugar and water, making a pleasant cooling and refreshing drink.

Professor Heer in his fossil Plants of S. Jorge, p. 30, t. ii. ff. 15, 16, represents two l. of this pl. And I do not see in what respect his figures of *Ilex Hartungi* p. 31, t. ii. ff. 23, 24 (especially f. 24) differ from large young l. on luxuriant barren shoots of the same.

Though included by Seubert (after DC. on Guthnick's authority) in his Fl. Azorica at p. 41, Mr. Hewett Watson believes that the true *V. maderense* has not been really found in any of the Açorian islands, as it assuredly has not in the Canarian. The Açorian pl. of which Seubert (Fl. Az. 41) makes improperly as Mr. Watson thinks two sp., *V. longiflorum* Wickst. (DC. vii. 573) and *V. cylindraceum* Sm. (DC. vii. 571), with a cylindric cor. 2–3 times the length of the cal. and twice as long as broad, is indeed very closely allied to the Madeiran, but yet seems, from living spec. kindly communicated by Mr. Watson, really distinct. In these the petioles and midrib beneath are quite smooth; but perhaps no reliance can be placed on this, for Seubert l. c. describes the l. as "subtus ad basin tantum subpubescentia." The l. are certainly no more properly caducous in the Açorian than in the Mad. pl.

END OF VOL. I.

ADDENDA ET CORRIGENDA.

Part I.

Page line

i 20 and *passim*, for "Dezertan" read: Desertan.
iii 23, for "*cassinoides* Hérit." read: *Dryandri* Lowe.
— 26, for "*alata* Decaisne" read: *fragilis* Desf.
iv 20, for "*pinnatum* Huds." read: *sylvaticum* (Huds. ed. 1).
— 37, for "*sylvestris* Lam." read: *sylvatica* Fr.
v 5, after *europæum* L. add: ?
— 8, for "*Porto-sanctana* Lowe" read: *Loweana* Webb.
— 21, for "*Victorialis* Poir." read: *ovata* Forsk.
— —, for "*Intybus* L. β. DC." read: *divaricatum* Schousb.
— 36, for "*stellatum* Sm." read: *villosum* Ait.
— 40, for "*fruticosa* Schr. γ, δ Lowe" read: *succulenta* (Ait.) β, γ Lowe.
— 43, for "*aculeatus*" read: *bucephalophorus*.
vi 1, 2, and *passim* (as in Title-page), for "Dezertas" and "Dezerta" read: Desertas and Deserta.
— 9 and 22, for "*fruticosa* Schr. α" read: *succulenta* (Ait.) δ Lowe.
— 38, for "*Phagnalon*" read: *Gnaphalon*.
vii 9, for "*fruticosa* Schr. α" read: *succulenta* (Ait.) δ Lowe.
— 11, for "*aculeatus*" read: *bucephalophorus*.
— 18, for "*Galium murale* L." read: *Aspera muralis* (L.).
— 19, for "*Carlovizia salicifolia* Less. β," read: *Carlina salicifolia* L. fil. γ. *latifolia* Lowe.
viii 21, for "*creticus* L." read: *grandifolius* Lowe.
— 27, for "*Intybus* L. β" read: *divaricatum* Schousb.
xi 6, for "*prostrata*" read: *erecta*.
— 9, for "*communis* L." read: *agraria* Kth.
— 15, after "crop" add: fruit, vegetable.
xii 19, for "dos Arrieiros" read: do Arreciro.
— 31, for "Encumcado" read: Encumeada.
— 18, (2nd column) for "dc" read: do.
— 22, („ „) for "de Baxo" read: Debaixo.
1 at bottom add:

Divison I. Dichlamydeæ.

Cal. and cor. distinct.

2 5, add: Pet. distinct, rarely 0.
3 16, "or *Ouradinha*" delc.
— 3 from bottom, for "Buch Verz. 195" read: Buch! 195. no. 300.

Page line

3 2 from bottom, for "*sylvaticus*" read: *sylvestris.*

4 4, for "de Seisal," "de Janella" read: do Seixal, da Janella.

5 14, add to syn.: Buch 195. no. 301; Seub. Fl. Az. 42.

— 18, add: A single pl. with perfectly double fl. occurred in Feb. 1865 by a roadside in Seixal.

— 29, add to syn. Seub. Fl. Az. 43. *R. sardous* Brot. ii. 371.

— 2 from bottom, for "Encomiado" read: Encumeada; and add: Fayal and Rib. da Maiata, P^{ta} da Cruz.

6 18, add to syn. Seub. Fl. Az. 43. no. 308.

— 19, add to syn.: Seub. Fl. Az. 43. no. 308 a.

— 22, after "road" add: At the Mount, S^{r} Moniz; and Rib. Fundo between Seixal and Rib. da Janella, March.

— 35, for "spreading" read: reflexed.

— 38, add to syn. Seub. Fl. Az. 43.

7 8, add to syn.: Buch 195. no. 299.

— 19, add: *Viuvas.*

— 23, add to syn.: Seub. Fl. Az. 43.

— 33, add: *Ciumes.*

— 4 from bottom, add: Seub. Fl. Az. 43.

— 3 from bottom, add: *Obs.* I am assured by my friend the Rev. W. W. Newbould, that this pl., though "truly the *D. Consolida* of Sm. in EB. t. 1839. is not *D. Consolida* of RFG. or of Svensk. Botanic., but clearly the pl. now called by British botanists *D. Ajacis*; whilst on the other hand *D. Ajacis* at p. 8, line 13, is possibly *D. orientale* Gay in Gren. et Godr. i. 47." I must however still adhere to my opinion that the latter pl., being certainly the true *D. Ajacis* of Linnæus (Sp. Pl. ed. 2. 748; Syst. ed. 12. ii. 370), is properly so called; and that his *D. Consolida* is rather my Mad. *D. Consolida* L.! *β. pubescens*, with pubescent caps., continuously wrinkled seeds, large deep-blue fl. and sparingly or loosely branched st., than the *D. Consolida* of many recent continental botanists (e.g. Rchb., Koch, Gay, Grcn. et Godr. Fl. Fr. i. 45) with smooth caps., interruptedly wrinkled scarious or scaly seeds, smaller blue or w. fl. and divaricately many-branched st., and to which belong probably the syn. of Clusius and Fl. Danica and certainly those of DC., Koch and RFG. f. 4669, referred in Mad. Fl. i. 7 to *D. Consolida* considered as including both these forms.

The 3 pl. would therefore stand in my view thus:—

1. *D. Consolida* L.

St. loosely and sparingly branched, rac. few-fld., caps. pubescent, style sublateral, wrinkles of seeds continuous.—Linn.! Sp. Pl., Syst. and Herb.!; Brot. ii. 302; Buch 195. no. 298; Sm. EB. t. 1839 and E. Fl. iii. 30; Bab. (ed. 4) 12. *D. Consolida β. pubescens* WB. i. 5; Lowe Mad. Fl. i. 7. *D. Ajacis* Gay in Gren. et Godr. i. 46 (not Linn.); Syme EB. (ed. 3) t. xlvii. (A.) (not Rchb.). *D.*

Ajacis var. v. sp. distincta Fisch. et Mey. Animadv. Bot. in Ann. des Sciences ser. 2, vol. v. 180.

2. *D. confusum* Lowe.

St. divaricately branched, rac. few-fld., caps. smooth, style lateral, wrinkles of seeds interrupted scarious or scaly.—*D. Consolida* of most recent continental botanists e. g. DC., Fisch. et Meyer l. c., Koch 24, RFG. f. 4669, Gay in Gren. et Godr. i. 45, probably Clusius Hist. ccvii. and Fl. Dan. t. 683, and partly perhaps Brot. ii. 302.

3. *D. Ajacis* L.

St. simple virgate with short erect side-branches, rac. densely many-fld. stiffly erect, caps. pubescent, style lateral, wrinkles of seeds continuous.—Linn.! ll. cc; Lam., Brot., DC., Fisch. et Mey. l. c.; WB. i. 4; Koch 24; RFG. f. 4670; Lowe Mad. Fl. i. 8. *D. Consolida* Fl. Gr. t. 504? (not Linn.). *D. orientale* Gay in Gr. et Godr. i. 47.

Page line

7 2 from bottom, add: Buch 195. no. 298;

8 25, add *Ciumes*.

— 36, for "Allegria" read: Alegria.

9 26, for "*Ameixeira*" read: *Ameixieira*.

— 31, add: Hook. J. of Bot. viii. 289.

— 33, for "Agoa de Bica" read: Agua da Bica.

— 34, for "dos Arrieros" read: do Areeiro.

— — after "Moniz" add: Boca dos Corgos between the Primeira Vista and Pico Grande along the Caminho Central (Capt. Norman).

10 3, after "*europæum* L." add: ?

11 11, for "de Conselho" read: do Concelho.

— 14, *Obs.* This, Prof. Babington believes, is *P. Lamottei* Bor. Fl. Centr. Fr. (ed. 3) p. 30.

12 10, after "Herb. ann." add: Mad. reg. 1, r.—And at end of same line add: Mad. at the Mount, Brazen Head, in the Rib. de João Gomes, de S^{ta} Luzia (S^{r} Moniz) and at Paul do Mar up the Voltas to Fajãa d'Ovelha; in PS. general about the town &c.

— 25, for "Dezertas" read: Desertas; and "or Madeira" dele.

— 33, "Curt." dele.

— 40, for "de" read: do.

13 10, add to syn.: Buch 195. no. 302; Scub. Fl. Az. 43.

— 12, for "Habit" read: Aspect.

14 2 from bottom, for "ex Germar" read: et Germ.

15 15, γ. *læta*. This is probably a distinct sp., *F. læta* Lowe.

— 20, for "de" read: do.

16 28, add: *F. Vaillantii* Loisel. is however now (1868) considered properly distinct.

18 between 7 and 8, introduce:

7. *bis.* HIRSCHFELDIA. Pod linear or oblong short few-seeded with a 1–2-seeded beak; valves convex with a

Page line

single dorsal nerve and a few lateral anastomosing veins; seeds ovoidal in a single row in each cell.

20 3 from bottom, after "29." add: *Cheiranthus littoreus* Buch! 196. no. 311. And for "MD." read: GD.

21 4, after "violet-purple," add: rarely in *a* (on sea-cliffs beyond Machico) bright rose-purple.

— 12, for "MD." read: GD.

— 23, add to syn. Buch 196. no. 314.

— 24, for "de" (twice) read: do.

— 40, add: *Goivos*.

22 4, for "P. de Conselho" read: P. do Concelho.

— 28, "*Quebra Panella*" dele.

— 33, before "*Dichroanthus*" insert: Bot. Reg. t. 1331. *C. argutus* and *C. dentatus* Buch! 196. nos. 312, 313.

23 6, add: *Ch. dentatus* Buch is merely a more hoary narrow-leaved form from more exposed or sunny rocks, such as are indicated by the locality "Ribeira dos Soccoridos," of the original specimens in BH.

— 15, after "Koch 37" add: Scub. Fl. Az. 43.

— 16, add to syn.: Buch 195. no. 309.

— 18, for "Dezertas" read: Desertas.

24 20, for "Gomez" read: Gomes.

— 4 from bottom: "EB. t. 492," dele.

— last line, after "Rib. Frio" add: do Fayal.

25 1, after "pubescent" add: Root vertical slender simply fibrous, often a mere tuft of fibres, always without any oblique subterranean st. or rhizome.

— 8, add: Possibly *C. sylvatica* Link (*C. hirsuta* EB. t. 492) may have been overlooked.

— 19, after "Koch 51," add: Scub. Fl. Az. 44.

— 20, after "EB. t. 735." add: Buch 196. no. 310.

— 5 from bottom, add at end: *Brassica muralis*, Buch 196. no. 317?

26 24, after "Metade" add: do Fayal (Levada dos Vinhaticos).

— 39, insert between this and line 40:

7 *bis*. HIRSCHFELDIA Mnch.

1. H. INCANA (L.).

Hispid-pubescent dull greyish not hoary, branches spreading straggling naked; lower l. lyrate, upper small remote and inconspicuous linear-lanceolate toothed; pods and pedic. close-pressed very short and narrow.—*H. adpressa* "Mnch. Meth. 264;" WB. i. 85; Gr. et Godr. i. 78. *Erucastrum incanum* Koch 61; EBS. t. 2843. *Sinapis incana* Juslen in Amœn. Acad. iv. 280; Linn. Sp. 934; Lam. Dict. iv. 344; Brot. i. 585; Pers. ii. 208; Brot. Phyt. ii. 205. t. 172; DC. Syst. ii. 618, Prodr. i. 220; Spr. ii. 913; Bab. 27. *Myagrum hispanicum* Linn. 893; Brot. i. 563 (status fructu subabortivo monstroso, rostro solum fertili). *Erucaria Hyrcanica* DC. Syst. ii. 676, Prodr. i. 230 (test. Fischer et Mey.) ex WB. l. c. 86. —Herb. ann. Mad. reg. 1, rrr. Magdalena, sea-cliff road to the

Arco de Calhéta beyond the tunnel and especially about the ruined Chapel of N. S. da Vida, very plentifully. The 2 varr. grow intermixed. May, June. Varr.:—

α. leiocarpum; pods, beak, pedic. and rac. quite smooth.—WB. l. c.; Amœn. Acad. l. c.; Linn. Sp. l. c.; Lam. Dict. l. c.; Brot. l. c.; Pers. l. c.; DC. ll. cc. *Myagrum hispanicum* Linn. l. c.; Brot. l. c. *Erucaria Hyrcanica* DC. ll. cc.

β. hebecarpum; pods pubescent, beak and pedic. nearly or quite smooth.—EBS. l. c.; Bab. l. c.

In habit, size, foliage and fl. strongly resembling *Rapistrum rugosum* L., but with the short-beaked pods of *Brassica nigra* (L.). St. and foliage pubescent dull pale greyish-gr., not smooth and shining glaucescent purplish or v. as in *B. nigra* (L.) and of mostly lower growth, 1–2 rarely 3 ft. high. St. and branches hard and very tough, the latter remote straggling spreading or declining naked or inconspicuously leafy retro-pubescent produced into long racemose corymbs and without the peculiar pendulous stalked smooth l. of *B. nigra* (L.). Fl. pale lemon-y.; sep. erecto-patent. Pedic. compressed 4-angular little more than one line long. Pods 3–5 lines long (of which the beak is one line), ¾ line broad subquadrangular slightly compressed and turgid 3–4 or 5-seeded; beak short compressed 2-edged 4-angular ovate or lanceolate, contracted at its base, about the length of its pedic. or half that of the pod, 1–2-seeded, upper seed fertile, lower abortive.

This pl. is so entirely local and confined to an extent of not much more than half a mile along a coast-road not formed above 8 or 10 years and 12 or 15 miles from Funchal, that it is extremely unlikely, though certainly possible, that it should have been really met with by Masson, particularly as no spec. from him is extant in BH., and no entry of it as a Mad. pl. has been made by Solander in his Mad. List. Notwithstanding, therefore, this recent discovery of the true *S. incana* L. in Mad., I still think that the pl. intended by Von Buch (p. 196. no. 320) under that name must have been the universal *S. nigra* L. (otherwise entirely omitted) as affirmed at p. 27 of this work.

Page	line	
27	4,	for "de" read: *tronchuda* ou.
—	30,	after "Presl 95" add: Seub. Fl. Az. 44.
—	38,	for "lemon-y." read: full lemon-y. almost golden-y., especially when compared with those of *Hirschfeldia incana*, (L.) which are pale lemon-y.
—	39,	after "long," add: one line wide.
—	40,	after "beak" add: the length of the pedic. and ¼ the length of the pod.
28	2,	for "is found" read: abounds.
—	3,	for "not yet occurred in Mad." read: only occurred in one place in Mad.
—	9,	after no. 317 add: But considering that *Sisymbrium erysimoides* Desf. is one of the commonest weeds on walls

Page line

and rubbish-heaps in Funchal and other villages in Mad. everywhere, and that it is otherwise unrecorded by Von Buch, it may almost safely be concluded that it was the pl. intended by *Brassica muralis* of his List.

28 18, for "*Saramago*" read: *Saramargo*.
— 22, for "seedless" read: mostly 1-seeded.
29 13, dele "Lowe" and add: *Couve da rocha*.
— 25, after "t. 28" add: Buch! 126. no. 319.
— 29, for "dos Arrieiros" read: do Areeiro.
30 3, dele "Lowe."
— 11, for "de" (twice) read: do.
— 12, after "2000 ft." add: P^ta^ do Sol, W. cliffs, and sea-cliffs between Tabua and Rib. Brava plentifully; also along the new road to Camera de Lobos near the Soccoridos Ravine (Capt. Norman).
— 21, add: *Couve da rocha*.
— 33, after "Metade" add: Rib. do Fayal (Levada dos Vinhaticos).
— 39, for "Entroza" read: Entrosa.
31 7, for "*Fedorente*" read: *Fedorenta*.
— 15, for "de Baxo" read Debaixo, and add: Apr.–June.
— 5 from bottom, after "162" add: Scub. Fl. Az. 44.
— 4 from bottom, for "*canariense*" read *canariensis*.
— 2 from bottom, after "Mad." add: , PS.,
32 1, for "Val" read Valle; and add: PS., Campo Debaixo in sandy places, S^r^ J. M. Moniz.
— 9, after "cell" add: in PS. often 2 or 3.
— 23, after "Fountain" add: Rib. do Fayal (Levada dos Vinhaticos).
33 6, "R. Br." dele.
— 9, after "t. 327" add: Buch 195. no. 308.
— 9 and 10, for "Bot. Misc. N. Ser." read: J. of Bot.
34 12, after "no. 306" add: Scub. Fl. Az. 44.
— 16, after "weed:" add: Sum., Aut., but often.
— 18, for "somewhat tough" read: very tough and hard.
35 32, add to syn.: *Cochlearia coronopifolia* (misprint for *Coronopus*) Buch 195. no. 307.
36 6, after "95" add: Scub. Fl. Az. 44.
— 10, for "Dezertas" read: Desertas.
— 19–24, See pp. 453, 454, *infra* Part IV.
37 33, for "Dezertas" read: Desertas.
— last line, after "var. *α*" add: Scub. Fl. Az. 44?
38 2, add to syn.: Buch 196. no. 321.
— 28, for "Praya," read: Praia; and for "Ponta S." read: Ponta de S.
40 4, for "de Facho" read; do Facho.
— 23, for "de" read: do.
— 29, for "its greater" read: its much greater.
41 10, for "*Saramago*" read: *Saramargo*.
— 29, for "*β*" read: *γ*.

Page line

44 14, add to syn.: Seub. Fl. Az. 44.

— 27, add:

The w.-fld. var. of the common English *V. odorata* L. has been introduced and is now (1868) fast becoming naturalized above 1500 ft.

— 32, for "V. SYLVESTRIS Lam." read: V. SYLVATICA Fr.

Obs. V. sylvestris Lam. being according to the French Botanists (e. g. Gren. et Godr. i. 180) *V. canina* L., the name of Fries, however inappropriate in Mad. to this Violet, must be adopted.

— 40, after "*caps.*" add: *smooth.*

— 40–43, The syn. should stand thus (omitting that of Lam.): *V. sylvatica* (Fries) Bab. 37; Gren. et Godr. i. 178. *V. sylvestris* RIB. t. 94. ff. 200, 201 and t. 601. f. 822; RFG. iii. t. 12. f. 4503; Koch 91 (not Lam.). *V. canina* EB. t. 620; DC. i. 298 partly. WB. i. 110 (not Linn.).

45 1, add to syn.: *V. sylvestris* Coss. et Germ. Fl. Par. 111 (not Lam.).

— 3, for "Torre de," read: Torreiro da.

— 4, for "Encumeado," read: Encumeada.

— 23, for "The modification *sylvatica* of the original name *sylvestris* would be" &c., read: The name *sylvatica* is, &c.

— 4 from the bottom, for "dos Arrieiros" read: do Arceiro.

— 3 from the bottom, after "peaks," add: Pico Grande "on one of the S. slopes very large and luxuriant," Capt. Norman R.N.

46 14, add: *Amor perfeito.*

47 6, for "*Tamagueira,*" read: *Tamargueira.*

— 20, for "Val," read: Valle.

— 33, after "trigonal" add: sometimes.

48 11, add to syn.: Seub. Fl. Az. 44.

— 18, for "*Resteira*" read: *Rasteira,* and dele: "*or Rasteyro.*"

— 31, after "Ponta" add: de.

49 12, for "SUBORDER" read TRIBE.

— 30, for "SUBORDER" read TRIBE.

50 20, for "SUBORDER" read TRIBE.

— 22, add *Craveiro.*

— 2 from bottom, "Webb and Berth." dele, and add: *Herva mel.*

51 18, add to syn.: Seub. Fl. Az. 45.

— 6 from bottom, add: from *S. lusitanica* L. and *S. quinquevulnera* L.

52 9, after "Ponta" add: de.

— 23, for "*Orelha Boi,*" read: *Orelha de boi* or *Rilha boi.*

— 32, for "Dez." read: Des.

— 37, add to syn.: Seub. Fl. Az. 45.

53 20, for "do Conselho" read: do Concelho.

— 23, "Nearly or": dele.

— 35, after "Ponta" add: de.

Page line

53 38, for "sometimes subciliate towards the base" read: the lower irregularly and minutely erosulo-subdenticulate.

54 2, "Except occasionally a few long hairs or cilia sprinkled on the edges of the l." dele. *Obs.* The hairs or cilia are essentially characteristic of *S. nocturna* L.

— 31, add:

Lychnis Flos Cuculi L., with double fl., has occurred once "amongst corn at S. Antonio near Funchal in June or July 1859" (H. Herschel, Mannheim); but it must have been merely an outcast or accidental straggler from some neighbouring garden.

55 3, for "SUBORDER" read: TRIBE.

— 8, after "smooth," add: or pubescent.

— 12, after "mucronate" add: mostly.

— 16, add to syn.: Seub. Fl. Az. 45.

— 34, for "acuminato-mucronate" read: acuminately cuspidate.

56 1, for "de," read: do.

— 12, add: *Orga* or *Gorda*.

— 25, for "Feijaã," read: Fajãa.

— 26, for "de" read: do.

— 3 from bottom, before "deflexed," insert: erect or.

57 13, after "Head" add: Caniço near the Fort by the sea, and on P^ta^ Oliveira, S^r^ J. M. Moniz;

58 15, for "Praza," read: Praça.

— 5 from bottom, for "de" read: do.

59 4, add: *Morugem*.

— 6, for "joints," read: nodes or knots.

— 14, add to syn.: Buch 196. no. 348.

— 17, for "Dezertas" read: Desertas.

— 32, after "Bab. 54." add: *S. graminea* and *S. uliginosa* Buch! 196. nos. 356, 357 (not *S. graminea* L.).

60 25, add to syn.: Seub. Fl. Az. 45.

— 30, for "de" (twice) read: do.

61 6, add to syn.: Buch 196. no. 358.

62 24, for "joints" read: nodes or knots.

— 34, for "beneath" read: below.

63 5, add: Cf. *C. azoricum* Hochst., Seub. Fl. Az. 45, t. xiv. ff. super.

— 7 from bottom, after "single," add: mostly.

64 14, after "DC. i. 440," add: Seub. Fl. Az. 46.

65 13, add to syn.: Jacq. Hort. Vind. t. 39.

— four last lines; *Obs.* This difference was due probably to change of colour merely in drying.

66 1, after "Madeiran" add:

γ. *ribifolia* Lowe; nearly smooth or only subhirtulose; st. procumbent; l. like those of *Ribes rubra* L., bright gr., sharply and finely toothed, sprinkled with a short sparse pubescence, with very long slender petioles pubescent upwards. Fl. small; pet. pale pink; pedic. long slender erect smooth or only here and there hirtose; cal.

Page line

smooth; involucral br. linear smooth; sep. smooth closing at first tightly over the smooth even capsules, presently becoming erect or patent and quite exposing the fr. Carpels (unripe) not toothed or margined, but when ripe strongly and sharply reticulato-cancellate, with the margins raised but entire, quite smooth; central disk small. —S^{ta} Cruz, a single pl. on a paved terrace in front of an old house on the left hand up a steep narrow street or road a little above the church (Torreiro da casa da S^{a} Vittorina, no sitio da Rochinha). Febr.–May. First observed by S^{r} J. M. Moniz, Febr. 1865. At the end of Apr. 1865 I found it still in fl. and fr., growing luxuriantly; but I could find no other pl. like it, either in its immediate vicinity or elsewhere in S^{ta} Cruz; though in all places, as well as growing with it, there was abundance of normal *M. parviflora* L. β, of which it was doubtless a mere transient or accidental individual form. In April 1868 I could find no trace of it either on the spot or elsewhere.

66 after line 16, before "2. M. MAURITIANA L." insert:

1 *bis*. M. NICÆENSIS All.

"Tolerably common about the Gorgulho, Casa branca and Rib. Seco fields, March 1865. I find that the two characters which are constant as marks of distinction from *M. parviflora* L. are the ovate or ovate-lanceolate involucral bracts and the size of the corolla, which is *always* distinctly larger than in that pl." (Capt. F. M. Norman R.N. in litt. March 23, 1865).

The following description was taken from fresh spec. sent to me at Scixal with the above remarks:—

Pale gr. hirtosely starry-pubescent; st. stout spreading prostrate or ascending; l. subreniform or broadly roundish-heart-shaped with 5 or 7 shallow obtuse or rounded crenate-*toothed* lobes, on long sparingly hirtose petioles which are often on the upperside thickly pubescent; stip. large ovate or subcordate smooth with only the edges ciliato-hirtose. Fl. moderately large and conspicuous, rather shortly but *distinctly stalked* in axillary clusters of 1–3 (mostly 3) together, the pedic. 2–3 (in fr. 4–6) lines long, *erect in all stages*; pet. 2–2½ length of cal. (say fully twice the length), ligulate-oblong, widely or distinctly notched, rose-purple with 3 darker nerves, their claw not ciliate or very partially indistinctly and minutely so; invol. br. 3 *ovate or ovate-lanceolate leafy and as long and large in fl. as the inner sep.*, smaller and more acuminate in fr.; both br. and sep. smooth with the edges hirtoso-ciliate; *pedic. in fr. always erect*; fr. quite smooth with the cal. incurved and erecto-patent only partially concealing the fr.; valves of carp. flatly and evenly (not sharply) neatly and finely cancellated at the back, *immarginate* with the edges *plain and simple*, not raised or prominent; the central disk quite small.

Page line
66 8 from the bottom, for "Praya" read: Praia.
— 7 from the bottom, for "Caniso" read: Caniço.
68 35, add to syn.: *S. carpinifolia* Buch 196. no. 341.
69 10, after "longer" add: Cal. with 2 or mostly 3 linear or linear-lanceolate br. at the base as in *Malva parviflora* L.
— 22, for "*Cha Ingleza*" read: *Cha bravo.*
— 29, *Obs.* The greatest difficulty and confusion besets the synonymy of this pl. Webb has certainly confounded two distinct sp. under his Can. *S. rhombifolia* i. 36,—one being identical with the Mad. pl. *a*, and the other, *S. oculata* Lowe (not found in Mad.) distinguished by its broader greener l. not canescent beneath, its larger deeper-coloured bright orange fl. with a dark purple eye and more numerous ("12–15") always 2-beaked carpels. His description as to size of l. and cor. can belong only to *S. oculata*; but in what it says of the underside of the l. and denotes of the carpel-beak or *mucro*, speaking of it in the singular number, it is only applicable to *S. rhombifolia* L. *a. maderensis* of the present work. I have therefore to offer the following corrected and enlarged synonymy for the Mad. pl.:—

S. rhombifolia, Linn.! Sp. Pl. (ed. 2) 961, cum var. *β*; Ejusd.! Herb. quoad ex. ad dextram schedæ (altero ad sinistram pedunculis petiolos vix superantibus prorsus distincto). *S.* fol. lanceolato-rhomboidibus serratis, Ejusd.! Hort. Ups. 199. no. 5.—Varr.:—

a. maderensis Lowe; carpels 1-rostrate, beak or awn from ½ to about the length of carpel.—*S. maderensis* Prim. 35, 36. *S. rhombifolia* Linn.! l. c.; Lam. Dict. i. 4; Buch 196. no. 340; WB. i. 36 (partly). *Malvinda unicornis* &c. Dill. Hort. Elth. 216, t. 172. f. 212. *Althæa Carpini folio* Bocc. Ic. 11, t. 6. ff. ii b, ii c. *Alcea Pharnambucana* Moris. Hist. ii. 528. § 5, t. 19. ff. 7, 8.—Mad. reg. 1, 2; ccc. Also found here and there by roadsides &c. in the Can. (Tenerife, Palma, and with a very short beak in Gomera), but confounded by Webb with another Can. sp., *S. oculata* Lowe.

Linnæus by his *β* in ed. 2 seems to have only intended to distinguish the more depauperated roadside wild state of the pl., as figured by Boccone and Morison, from the luxuriant cultivated form of the Hort. Eltham. and of his own Herb.

β. canariensis Lowe; carpels 2-rostrate or bicuspidate, beaks shorter than in *a.*—*S. rhombifolia* Cav. Diss. i. 23, t. 3. f. 12; Willd. "iii. 740;" Poir. Suppl. i. 20; Pers. ii. 243; Spr. iii. 111. no. 22; DC. i. 462. no. 35; Scub. 46. *S. canariensis* Willd. "iii. 735;" Poir. l. c. 19; Pers. ii. 242; Spr. l. c. no. 24; DC. l. c. no. 34 (excl. syn. *S. alba* Cav. t. iii. f. 8, quæ aristis glochidiatis carpellorum distinctissima).—Mad. reg. 1, r. Calheta, P^ta do Sol, P^to da Cruz at the Serrado. Not found in the Can. by the writer!

Page line

70 12, 13, the words in parenthesis, dele.
— 15, for "Inglez" read: bravo, and for "English" read: wild.
— 16, "-pl." dele.
— 21, before "soft" insert: thin.
— 27, after "sep." add: seeds naked.
71 1, after "Seeds" add: naked.
— after line 2 add:

Abutilon permolle (Willd.) has been growing for some years spontaneously in S^r^ J. M. Moniz's garden in Funchal, and is very likely to become more widely naturalized.

72 25, for "*Limoeira*" read: *Limoeiro*.
73 4, "or shr." dele.
— 37, add: The true Shaddock is probably a good sp. It is described by Grisebach (W. I. Fl. 132) as having the l. beneath and young shoots puberulous. My friend Mr. Wollaston says of his conservatory-spec. from Messrs. Veitch's nurseries, that the fl. are purple in the bud and the l. thick and coriaceous as in *C. medica* L.
74 38, for "recession of the edges" read: recession of the inner edges of the carp. from the axis.
— 45, after "unchanged" insert: The Citron (*C. medica* L.) is the favourite stock at Magdalena, where 2 trees, one on each side the door of S^r^ Nuno de Freitas's house in 1863 were 16–18 ft. high, with the branches extending circularly over a space of 50–60 ft. in circumference and loaded with fr.
75 26, for "*Malforada*" read: *Malfurada*.
— 34, add to syn.: Seub. Fl. Az. 46.
76 18, for "Gomez" read: Gomes; and after "Palmeira" add: below Boa Nova.
— —, for "de" read: do.
— 20, for "July" read: May.
— last line, after "cc." add: PS. (Herb. Paivæ) reg. 1, 2; rr.
77 1, prefix: in Mad.
— 2, for "das Romeiras" read: dos Romeiros; and for "de" read: do.
— 3, after "&c." add: "PS. sea-coast and Pico d'Anna Ferreira, E. side" (Paiva).
— 6, after "young" add: vigorous.
— 16 from bottom, before "DC. i." insert: Brot. Phyt. i. 189, t. 77.
— 13 from bottom, for "das Romeiras" read: dos Romeiros.
— 8 from bottom, add at end: and erect, often a little ascending and.
— 6 from bottom, for "between" read: along.
78 7, for "forked" read: once-forked.
79 5, *Obs. H. humifusum* L. should precede *H. perforatum* L., as approaching nearest of the two to *H. linarifolium* Vahl.
— 5, for "*Erva*" read: *Flor*.

Page line

79 14, add to syn.: Seub. Fl. Az. 46.
— 29, add: Pelicão.
— 36, add to syn.: Seub. Fl. Az. 46.
— 2 from bottom, for "H. QUADRANGULUM L." read: H. UNDULATUM Schousb.
80 for lines 8 and 9, read: "Schousb. in Willd. Enum. 810;" Höll's List in Ratisb. Fl. and Hook. J. of Bot.; Briggs in Seem. J. of Bot. ii. 45; Bab. ibid. 97, t. 16; Hance ibid. v. 299. *H. quadrangulum* ε. *undulatum* Chois. in DC. i. 518. *H. Bœticum* Boiss., Walp., Syme in EB. ed. 3. ii. 153, t. 270 *bis* and *H. Neapolitanum* Ten., Guss. (ex Bab.). *H. decipiens* Wats.! "in Lond. Journ. Bot. iii. 589; Walp. Repert. v. 141" (ex Bab.).
— 13, for "Passa," read: Passo.
— 14, after "road," add: Seixal, Rib. Fundo.
— —, for "1–2 ft.," read: 1–4 ft.
— 15, for "6-9," read: 6–12.
— 19, after "pale," add: golden.
— for lines 24–27 read:

It can only, therefore, be surmised that possibly by *H. ovatum* the present pl. might be intended, and that the name was afterwards suppressed by Solander under the subsequent idea of its identity with *H. quadrangulum* L., to which he would have doubtless then referred it; for he has left no record of the char. of his *H. ovatum*.

— 31 and 44, prefix ††† to each.
81 17, before "*Sercial*" insert: *Cercial* or.
— —, for "*Lestraõ*" read: *Listrão*.
— —, for "*Cara*" read: *Carão*.
— 18, for "*Moça*" read: *moça*.
— 20, "*Bual* or" dele.
— 21, for "*Babozo*" read: *Baboso*.
— 25, for "*Malvazia*" read: *Malvasia*.
— 26, for "*baboza*" read; *babosa*.
— 36, for "Malvazia" read: Malvasia.
— 37, for "Bual" read: Boal.
82 1, for "Malvazia" read: Malvasia.
— 2, for "Bual" read: Boal.
— 9, for "Hockheim" read: Hochheim.
— 25, for "Fazenda" read: Fajãa.
— 27, for "Estreita" read: Estreito.
83 5, before "trellises" insert: horizontal.
— 7, for "Balsêiros" read: Balsêiras.
84 5, for "*Passas*" read: *Passara*.
— 18, for "de" read: da.
— 41, for "*Passinhas*" read: *Passara*.
85 6, add to syn.: Buch 196. no. 336; Seub. Fl. Az. 47.
— 28, for "*Passinhas*" read: *Passara*.
87 3, for "Agoa" read: Agua.
— 4, for "Encumeado" read: Encumeada.

Page line
88 13, for "de" read: do.
— 32, add to syn.: Seub. Fl. Az. 47.
— 34, for "Praya" read: Praia.
— 35, for "d'Escalas" read: das Cales.
— 37, for "P. Juliana" read: P. de Juliana.
89 5, "Hérit." dele.
— 16, for "(L.)" read: Linn.
— 19, for "de" read: do.
— 23, for "de" read: do.
— 38, "Hérit." dele.
90 14, for "d'Escales" read: das Cales.
— —, for "de" read: da.
— 15, for "d'Escales" read: das Cales.
— 16, for "Abobaras" read: Aboboras or Abobras.
— 4 and 3 from bottom, for "de" read: do.
92 31, after "56" read: Seub. Fl. Az. 47.
— 34, for "Praya" read: Praia.
— 36, for "de" read: do.
— —, for "Serra Dentro" read: Serra de Dentro.
93 39, after "Cruz," add: Machico and about the Casa Branca, Loo fields near Funchal.
— 42, after "island" add: Apr.–June.
94 28, prefix ††.
95 23, after "pass" add: in gardens in Mad.
96 37, for "Gomez" read: Gomes.
— —, for "das Romeiras" read: dos Romeiros.
98 24, for "Sep. 3–5– or" read: Sep. 3, 5 or
— 36, for "Praya" read: Praia.
— 39, after "veins" add: drooping in bud.
— 40, after "Pet. crenate" add: Caps. ovate-globose pointed acute, perfectly smooth within and without.
99 5, after "i. 498" add: Bab. 66.
— 7, before "Mad." insert: Herb. ann.
— 30, prefix †.
— 32, prefix †.
— 3 from bottom, add to syn.: Scub. Fl. Az. 47.
100 39, before "*O. caprina*" insert: Subv. 1; fl. single.
— 40, for "(with single fl.)" read:—Herb. per. Mad. reg. 2, r. The Mount, S^{r} Moniz; roadside up the Machico valley.
— 41, for "β. *pleniflora*," read: Subv. 2.
— 42, for "many," read: several.
— 43, after "Deancry," read: Estreito de Calheta, a little below the Church.
101 6, for "always," read: mostly.
— 9, for "PURPUREA Jacq." read: VENUSTA Lowe.
— 18, before "Jacq." insert: *O. purpurea.*
— 23, after "Camacha," add: up the Machico valley and Achada of P^{to} Moniz, where the tubers are eaten by the children.
— 37, add: A new name is necessitated by the preoccupation of *purpurea* by Linnæus for a very different sp.

Page line
102 26, for "dc" read: da.
103 31, for "Ponta S.," read: Ponta de S.
— 32, for "de Baxo," read: Debaixo.
— —, for "de Conselho," read: do Conselho.
104 13, for "*Moquem* or *Moquino*" read: *Mocan* or *Mocano* (P^to^ da Cruz).
— 21, for "Seisal," read: Seixal.
— —, "growing in large quantities:" dele.
— 22, for "and" read: up the.
— —, for "1857" read: where (June 5th 1863) I found 10 small tr. growing in a group close below the source or Fonte itself in the thick jungle of *Vaccinium* and Heath, both in fl. and with full-grown but unripe fr.
— 23, "who" dele.
— 24, after "rocks," add: and in P^to^ da Cruz, where it is called *Mocano*, I have both had it brought to me by a shepherd from "rocks towards Pico da Suna" (with the l. infested with a very peculiar brown peltate gall) and seen it growing on rocks along the Levada dos Lamaceiros under P. da Suna towards the Rocha furada.
— 29, for "4–6," read: 2–6.
— 38, after "inconspicous," add: above.
— 39, "at least" dele.
— 43, after "spathulate," add: rarely acute.
105 4, at end, add: or of the fl. of *Olea fragrans* L. with the fr. of an Orange.
— 16, after "Pet.," add: distinct, a little cohering in the middle.
— 19, after "anth." add: adnate.
— 26, after "rusty-brown" add: smooth and even while fresh, but when dry.
— 29–35, dele, and substitute:

The P^to^ da Cruz name *Mocan* or *Mocano*, often corrupted into *Moquem*, *Moquin*, *Moquinho* or *Moquino*, belongs at Seixal, Rib. Fundo and Rib. da Janella properly to *Visnea Mocanera* L. fil.,—a pl. the first discovery of which is due to the accurately discriminating eye of S^r^ J. M. Moniz, who in the summer of 1856 first found and distinguished it on its native rocks at Seixal from *Catha* or *Celastrus Dryandri* Lowe (called *Buxo* at Seixal), which it very much resembles: thus at once.

Part II.

107 8, add: Petals distinct.
108 5, for "Caniso" read: Caniço.
— 13, for "Dec., Jan." read: Fl. Dec., Jan.; fr. March–May.

Page line

110 26, after "torrent" add: between Rib. Fundo and Rib. da Janella.

— 27, for "Furada" read: Rocha furada.

— 28, after "Frio" add: S. Antonio da Serra towards Machico, Capt. Norman.

111 12, add: *Tintureira.*

112 6, for "Azores" read: Açores.

— 17, for "Azorian" read: Açorian.

115 25, before "9. TRIFOLIUM" &c., insert:

8 *bis.* TRIGONELLA. Cal. *subequally* 5-fid. Pet. *free caducous.* Fil. *not* dilated upwards. Pod *exserted linear or oblong* slightly *curved or falcate more than* 4-*seeded.*—Fl. in axillary mostly *few-fid. umbels* or umbellate rac.

117 7 from bottom: prefix †††.

118 13, after "*lateral.*" add: Seeds *mostly reniform*, hilum *short central estrophiolate.*

— 18, after "sutures." add: Seeds *oval*, hilum *short central strophiolate.*

— 21, after "*sutures.*" add: Seeds *oval*, hilum *long linear excentric strophiolate.*

120 after line 29 insert:

†††1 *bis.* L. ANGUSTIFOLIUS L.

St. branched irregularly from the base; lfts. linear or linear-oblong obtuse or retuse flat adpressedly pubescent subglabrescent; fl. small pale dull bl. bractleted subalternate subsessile in short congested inconspicuous few-fld. rac.; lower lip of cal. much longer than the deeply bifid or bipartite upper, ovato-lanceolate entire, br. ovate broad and short; pod villous-pubescent 45–55 millim. or about 2 in. long, 12–14 millim. or about ½ in. broad, 4–5-seeded torulose, upper suture sinuate produced into a short beak; seeds smooth and even globosely ovoidal scarcely if at all compressed 8×7 or 6 millim. in diam. or ⅘ the width of cavity of pod, marbled with dark red or purplish brown and drab or fulvous mottled with w. speeks or spots.—Linn. Sp. 1015; Lam. Dict. iii. 624; Desf. ii. 154; Brot. ii. 132; Pers. ii. 294; DC. ii. 407; Spr. iii. 228; Koch 173; Gren. et Godr. i. 367.—Herb. ann. Mad. reg. 1, rrr. To the W. of Funchal on the old or upper road to the Praia under Pico da Cruz on a line from its summit down to the Gorgulho on a bank by the roadside; also a little above this spot along the Levada dos Piornães, and again in borders of cornfields at the W. end of the Praia between the beach and the cliffs. March–June.—Branched but not proliferously, somewhat bushy, 1–2 ft. high, dark gr. Lfts. ½–1½ in. long, ½ line–3 lines wide. Fl. inconspicuous indigo-bl. in short terminal rac. scarcely exserted above the foliage; br. pedic. rachis sep. and young pods covered with rusty or fawn-col. pubescence. Seeds at first tawny-brown mottled or speckled with yellowish-w. and subreticulated with dark purplish or reddish brown. The same seeds in the course of 3 or 4 months when quite dry became as fol-

lows: elegantly, thickly and subreticulately mottled with numerous pale drab and a few smaller pure w. spots on a rich dark reddish or purplish brown ground. They are now, after the lapse of 5 years, tawny or dark fulvous marbled subreticulately with dark red or purplish brown and mottled with w. spots or specks; there is also a w. or pale round space about the *hilum* with a faint triangular or sagittate dusky brown or blackish spot close above and a linear streak below it.

Page line
122 23, for "de" read: da.
— 35, for "or" read: for.
— 36, for "he" read: the; and for "5–7" read: 4–7.
123 9, for "Azores," read: Açores.
— 7 from bottom add:

At Fajãa d'Ovelha, May 18th 1863, in the Rib. do Alcaide a little beyond the Lombo dos Marinheiros, on or a little above the road to P^ta^ do Pargo, I was shown by a countryman 2 pl. of this singular var. growing apart on a hill-side amongst a thicket of the common y.-fld. sort, of which it has precisely the habit, size and aspect in all points except the fl. These in the bud at least, are cream-col. rather than pure w., and often the wings and keel have a slight pale y. tint. These 2 pl. were nearly out of fl., whilst the common y.-fld. sort was still in full bloom; in accordance with the declaration of the people on the spot, that it flowers earlier than the common kind. Again, at P^to^ da Cruz, May 8th 1867, specimens were brought to me from the mountains with pale lemon-y. rather than cream-col. fl. Thus the two sorts blend together, and the w. fl. may even prove not to be constant on the same bush.

124 3, after "soft" insert: mostly. And after "fulvous" insert: but sometimes silvery-w. adpressed or loose.
125 2, before "brown" insert: mostly (especially in Rib. Frio).
— 9, after "P^ta^ Delgada" add: and also along the sea-cliff road between S. Vicente and Seixal about the Waterfall from the Rib. de João Delgada.
128 32, after "Pods" insert: dark coffee-brown.
130 12, for "da" read: de; and for "P^ta^ S." read: P^ta^ de S.
— 24, for "P^ta^ S." read: P^ta^ de S.
— 8 from bottom,

2. Ononis micrantha Lowe.

Obs. The name *micrantha* was given to this pl. without observing that there was already an *O. micrantha* Thunb. It would have been every way better to have called it *O. microsperma*. But as Thunberg's pl. is now referred to *Lotononis* DC., no change is necessary.

Page line
131 5, after "Lowe Nov. p. 25 or 547" add: (not Thunb.).
— 8, for P^ta^ S." read: P^ta^ de S.

Page line
131 3 from bottom, for "P^ta S." read: P^ta de S.
132 28, 29, between these insert:

2 *bis*. O. SERRATA Forsk.

Herbaceous annual glandular-pubescent viscid leafy light gr. much branched at the crown, st. numerous slender procumbent or ascending: lower l. ternate, upper or floral simple; lfts. thin membranous flaccid narrow linear-oblong 3 or four times as long as broad obtuse or almost truncate, sharply and remotely inciso-5–6-toothed on each side, the middle lft. long-stalked; stip small acuminately lanceolate entire; fl. small inconspicuous solitary erect in terminal leafy spikes or rac., shorter than the l., the cor. scarcely longer than the sep.; cal. small and narrow not dilated after fl. with 5 equal entire linear-acuminate strongly 3-ribbed divisions as long as the cor. or pod; the latter short broadly oblong turgid 3-seeded nearly or quite as long as sep.: seeds subcompressedly globose very small (1 mill. in diam.) very finely granulated plain-col. light-fulvous or ochre-y. or orange-tawny.—Forsk.! Fl. Ægypt.-Arab. 131; Pers. ii. 290; Poir. Suppl. i. 738; DC. ii. 163; Spr. iii. 179; WB. ii. 29 var. *α* (not *β* l. c. and t. 55).—Herb. ann. PS. reg. ?, rrr; S^r Moniz, Dec. 1856. —St. numerous prostrate the ends ascending 3–6 in. long forming a cespitose leafy tuft or patch, the short main st. sometimes erect. Lfts. 3–6 lines long, 1–2 broad often truncate and 3–5-toothed at the tips with 3 or 4 four more remote teeth below on each side. Fl. dull rose or purple nearly sessile or shortly pedicelled in short distinct terminal rac., not longer than the slender narrow acuminate divisions of the cal. which remains unchanged in fr. Pod shortly oblong or oval, in the latter case shorter than the sep., 4–5 mill. long, 2 broad, pale fawn-col. or yellowish-brown, 3–4-seeded. Seeds 1 mill. in diam. or half the size of those of *O. micrantha*, closely and minutely granulated as if frosted, at first light fulvous, then darker tawny orange.

O. serrata Gren. et Godr. i. 375 seems to be something very different from the above pl.

Page line
133 31, for "Agoa" read: Agua.
134 12, do. do.
136 1, after "Tribe III. *Trifolieæ*," insert:

8 *bis*. TRIGONELLA L.

1. T. ORNITHOPODIOIDES (L.).

St. prostrate; lfts. denticulate obcordate or obovate-wedgeshaped; stip. submembranaceous lanceolate finely subulato-acuminate entire; fl. linear slender in shortly stalked axillary 1–5-fld. umbels; cal.-teeth subequal linear-acuminate longer than the tube, cor. linear, standard longer than the wings which are shorter than the pointed keel; pods erect oblong compressed subarcuate shortly mucronulate not nerved or wrinkled subpubescent sometimes glabrescent, upper or convex suture bordered; seeds 4 or 5–8 or 10 oval or ovate sub-

compressed perfectly smooth and even.—DC. ii. 184; Spr. iii. 284; Gren. et Godr. i. 398. *Trifolium* (*Melilotus*) *ornithopodioides* Linn. Sp. 1078; Fl. Dan. t. 368; EB. t. 1047; Hook. Fl. Sc. i. 218; Sm. E. Fl. iii. 298; Bab. 78. *Melilotus ornithopodioides* Desr. in Lam. Dict. iv. 67; Pers. ii. 348. *Fœnugræcum humile repens*, &c. Raii Syn. 331, t. xiv. f. 1; *Falcatula falso-trifolium* Brot. Phyt. i. 160, t. 65.—Herb. ann. Mad. reg. 4, rrr. "Between Pico do Areeiro and P. do Cedrão, plentifully in a turfy patch amongst rocky passes," Capt. Norman, June 1866.—A small inconspicuous pl. easily overlooked in the short mountain turf. Whole pl. smooth. St. prostrate or procumbent, several from the crown, 1–4 or 5 in. (in Mad. ½–1½ in.) long, scarcely branched. Petioles long, lfts. small strongly nerved and sharply serrulate, the nerves excurrent. Fl. slender about 3 lines long and 1 line broad, white in Mad. according to Capt. Norman and as they appear to have been in his dried spec. before me; reddish or pink in Europe. In numerous dried Mad. spec. from S^{r} Moniz also there is no trace of colour, and they certainly appear to have been either w. or cream-col. Umbels mostly 2- or 3-fld., in Mad. often 1-fld. and very shortly stalked, but all the spec. are much dwarfed and depauperated. Pods bivalve dehiscent, in these spec. 4–6-seeded, 5 mill. long, 2 broad, exserted and 3 or 4 times as long as cal.-tube. Seeds 1½ mill. long, 1 broad, smooth and shining, plain-col. liver-brown or fulvous, roundish-oval or ovate, not at all cylindric or truncate at each end.

Page line
136 23, for "P^{ta} S." read: P^{ta} de S.
— 36, between this and the next line insert:

††1 *bis.* T. INCARNATUM L.

The common cult. bright deep red or crimson var. of this (BM. t. 328) has been observed by S^{r} Moniz at the Palheiro both naturalized and growing as a crop.

Page line
137 21, for "but hairy" read: open smooth not closed with hairs.
138 11 from bottom, after "road" add: P^{ta} de S. Lourenço on the Ilheo dos Embarcadores.
139 20, after "Lemann" add: S^{ta} Cruz, Machico near S. Roque's Chapel, P^{to} da Cruz on beach-road to Curral do mar (Capt. Norman and S^{r} Moniz).
140 16, after "spreading" add: S. Antonio da Serra here and there in fields about Mr. Blandy's house, more lately introd. from England.
141 after line 18 insert:

7 *bis.* T. BOCCONI Savi.

Furry-pubescent *dark dull gr.*: st. procumbent *straight rigid* densely but shortly *furry-pubescent* like the petioles; lfts. *oblong-lanceolate*, the lower obovate, *glabrescent* or smooth above, minutely denticulate upwards, the nerves *straight* not curved or thick-

ened; heads ovoidal or shortly cylindric-oblong *very dense compact and many-fld.* solitary or geminate sessile lateral and terminal, *inconspicuously bracteate* by the stip. of the floral l. at the base; cal.-tube 10-ribbed *cylindric-obovate* pubescent, throat open, teeth hairy at the base, smooth upwards, acuminato-subulate or aristate straight erect unequal, the longest as long as the small inconspicuous cor., *the tube and teeth unchanged in fr.*—Poir. Suppl. v. 333; DC. ii. 192; Spr. iii. 216; WB. ii. 73; Koch 188; Gren. et Godr. i. 411; EBS. t. 2868; Bab. 77. *T. semiglabrum* Brot. Phyt. i. 155, t. 63. f. ii. *T. collinum* Bast. (Poir. l. c.).—Herb. ann. Mad. reg. 2 (upper part), rrr. Pico da Silva, E. side or slopes of summit, end of June, 1862, growing mixed with *T. striatum* and *T. scabrum*, Dr. Robertson.—Not at all softly downy or hoary, but rather harsh, and, except the st. and petioles, naked or glabrescent and of a dull dark gr. Main st. erect short 2 or 3 in. high, side st. from its base several procumbent 2–5 or 6 in. long, their ends ascending, all hard and stiff, dark purplish brown. Foliage somewhat scanty, upper and floral l. nearly or quite sessile with narrow-oblong lfts. 3–9 lines long, 1–3 broad, and stip. subdilated but not large or sheathing at the base; lower l. stalked with smaller broader and shorter lfts.; the stip. on the whole subinconspicuous ovate produced into two acuminato-subulate or aristate free points, membranous and dark-nerved at the subdilated base. Lfts. smooth above, a little hairy only at the edges and beneath, the lower not shortly and broadly obcordate. Heads 3–6 or 8 lines long, 3 broad, hard and rather harsh, the terminal mostly geminate, all with very numerous small densely compact fl., not changed or botryoidal in fr., dull purplish or reddish; cor. small pale pink or blush, soon turning brown, persistent. Cal. unchanged in fr., its teeth always erect dark purplish stiffish but not pungent; tube not turgid urceolate or berry-like in fr., with the ribs or nerves alternately very strong and weak, and the throat open without hairs or callous lips. Pods "membranous subglobose 1-seeded." Seed very "small [1 mill. in diam. by fig.] ovoidal y. or pale brown, with the radicle slightly prominent" (EBS. l. c.).—I am greatly indebted to its discoverer for spec. of this interesting addition to the Mad. Trefoils.

Page line

141 14 from bottom, for "P^{ta} S." read: Paul do mar and P^{ta} de S.

143 3, after "mile out;" insert: Paul do mar.

— 4, for "P^{ta} S." read: P^{ta} de S.

144 3 from bottom, after "P^{ta}" add: de.

148 30, after "Grande," insert: Paul do mar.

149 21, after "ann." insert: Mad. reg. 1, rrr.

— 22, after "rrr." insert: Praça Academica, Funchal; Praça at S^{ta} Cruz under the Laurel trees (Capt. Norman and S^{r} Moniz).

150 17, after "Camacha," insert: Paul do mar.

— after line 29 insert:

17 *bis*. T. CERNUUM Brot.

Smooth succulent light gr.; st. slender wiry procumbent elongate diffusely branched and spreading, subremotely leafy, hollow; petioles long slender; lfts. obcordate or retusely obcuneate or obovate, mueronulate, finely and sharply serrulate, the nerves simple (not thickened) excurrent; heads umbellate many-fld. hemispherical on short erect slender or filiform axillary ped. much shorter than the petioles; fl. small distinctly stalked lax subumbellate drooping or deflexed in fruit, their pedic. smooth as long as the cal.-tube, with a minute setaceous bractlet at its base much shorter than itself; cal. 10-ribbed or striate, unchanged in fr., the tube sprinkled upwards with a few hairs, glabrescent downwards, throat naked open, teeth smooth finely aristato-linear-acuminate, in fr. setaceo-subulate, subequal, the two upper rather longer than the lower and as long as the cor., at first erect, then spreading, recurved in fr.; cor. marcescent persistent, standard much longer than the keel or wings, dilated or spoon-shaped and distinctly emarginate or concavely obcordate striated, scarious and deflexed in fr.; style uncinate at top; pod sessile ob-ovate-oblong scarcely exserted 1–4-seeded, seeds small subreniformly oval y. or fulvous.—Brot. Phyt. i. 150, t. 62; DC. ii. 199; Spr. iii. 208. *T. serrulatum* Lag. Gen. et Sp. Nov. 23? *T. minutum* Coss. Notes sur quelques Plantes Critiques (Paris, 1848). *T. Perreymondi* Gren. et Godr. i. 422; Lloyd Fl. de L'Ouest de la France (ed. 2, 1868) p. 141. "*T. parviflorum* Perreym. cat. Fréjus p. 84 (non Ehrh.)" Gr. et Godr. l. c.—Herb. ann. Mad. reg. 2, 3, rrr. Rib. das Freiras, a small branch ravine above the road, W. of Caniço, S^{r} Moniz; plentifully in a wet place close to the path descending into the Curral das Freiras near Pico do Cedro, and in a very dwarfed depauperated state in the mountain turf on Pico Grande, Capt. Norman. June–July.—Closely connecting Sect. V. *Lotoidea* L. with VI. *Lupulina* L., and perhaps rather belonging by its scarious striated deflexed spoon-shaped standard to the latter. Yet in habit it approaches rather nearer *T. repens* L., though it is altogether much more delicate and slender. It has also been compared with *T. glomeratum* L., but I cannot see the affinity. Whole pl. smooth tender or succulent flaecid light gr. Root small fibrous; st. numerous from its crown, 6–12 or even 18 in. long, round but strongly grooved or striate, procumbently spreading all round, the ends ascending. Stip. membranous ovate finely acuminato-aristate or produced into long setaceous points. Lower petioles 2 or 3 in. long, upper about $\frac{1}{2}$ in., all slender filiform. Lfts. 3 or 4–6 lines long, 2–4 lines broad, perfectly smooth with numerous straight sharply spinuloso-excurrent nerves. Ped. 2–3 lines long always erect smooth from $\frac{1}{3}$ to $\frac{1}{4}$ the length of the petioles. Heads from 20 to 30 or more-fld., fl. about 2 lines long, narrow-oblong, at first fasciculate and somewhat lax and spreading, presently umbellately close-deflexed as in *T. repens* L. Cor. pale whitish-pink or flesh-col. or w. with darker lines, turning brown in fr. Cal.-tube compressed, narrow oblong in fl., obovate and strongly 10-ribbed in fr., not dehiscent. Seeds subcompressed, 1 mill. in their longer diam.

T. serrulatum Lag. is perhaps the same pl., but it is too imperfectly described to be positively quoted.

Page line

151 6, after "Curt." insert: Gren. et Godr. i. 423; Benth. Handb. i. 207. f. 258.

153 1, after "82" insert: *T. procumbens* Gren. et Godr. i. 423; Benth. Handb. i. 208. f. 259 (not Linn. or at least only partly).

— 7 from bottom, the comma before "standard" dele, and insert one after it.

— 6 from bottom, before "which" insert: and.

— at bottom add:

Obs. The number of Mad. *Trifolia* is by these additions raised to 22. In the Canaries Webb has enumerated 18; but he has doubtless overlooked some. Seubert mentions only 8 in the Açores. In the Cape Verdes I did not find a single sp., and Dr. J. A. Schmidt records only one, *T. glomeratum* L.

157 9, after "itself" insert: Capt. Norman, however, has lately found it growing plentifully in one spot on the edge of the cliff above the Praia formosa to the W. of Funchal.

— 17 from bottom add at end: All. Fl. Ped. ii. 314. no. 1150.

169 4, for "S. Anna" read: S^{ta} Anna.

— 6 from bottom, for "10 or 12" read: 18–24.

172 after line 6, insert:

††5. Lotus ornithopodioides L.

Ann. more or less pubescent; st. branched ascending or diffusely erect glabrescent downwards; l. shortly petiolate subvillose; lfts. obovato-cuneate, the upper subrhomboidal; stipules broadly rhomboidal sessile as long as the petiole; ped. erect or erecto-patent as long as or longer than the l.; umbels 3–5-fld. with a sessile 3-foliate leaf or br. at its base; cal. hairy, teeth subvillose as long as the tube, narrow-lanceolate finely and simply acuminate (not keeled at the tip); fl. small y., standard orbicular, keel ascending bent upwards at almost a right angle shortly beaked and acute, wings obovate not quite covering the keel; pods quite smooth and shining (chestnut-brown) a little drooping, slightly arcuate or falcate, 3–5-fascicled, linear, compressed, strongly torulose or lomentaceous, the valves finally twisting spirally, 10–17-seeded; seeds orbicular much compressed or flattened, quite smooth and even, dark fulvous or tawny brown.—Linn. Sp. 1091; Lam. iii. 607. "Cav. Ic. ii. 48, t. 163;" Desf. ii. 203; Pers. ii. 353; DC. ii. 209; Spr. iii. 281; Koch 196; Gren. et Godr. i. 434. *Lotea ornithopodioides* "Much. Meth. 151;" WB. ii. 80. *Lotus πολυκέρατος annua procumbens siliquis ornithopodii* Moris. Hist. ii. 176. § 2, t. 18. f. 8.—Herb. ann. Mad. reg. 2, rrr. Campanario, below the church in a single spot, S^{r} J. Moniz. May.—Whole pl. pubescent, almost hairy upwards, light gr., slightly hoary, leafy. Root small fibrous tubercul iferous. St. and branches slender round wiry hard and stiffish, 8–12 in. long,

suberect or procumbent, glabrescent downwards. Stip. and lfts. rather large, the latter 3–6 lines long, 3–4 broad, the former rather smaller or shorter and more rhomboidal. Upper lfts. subacute. Petioles 2–3 lines long; ped. 9–10 or 15 lines. Fl. rather small and inconspicuous, 3 lines long, in stalked axillary umbels, with a sessile 3-foliate l. or bract at their base, lemon-y. Style and stigma simple slender filiform. Pods fascicled drooping like a dead bird's claws, 1–1¾ in. long, 1–1¼ line broad, compressed but strongly torulose and even slightly constricted between the seeds, altogether much like those of *Ornithopus compressus* L. but narrower and of a shining chestnut-brown col. and quite smooth. Seeds lenticular, mostly about 15.

Page line

172 14, after "both" insert: mostly.
— 18, after "base" insert: mostly.
— 8 from bottom, for "not" read: rather than.
— last line, after "Cal." insert: often.
173 24, after "P. GLAUCA (Ait.)" add: *Trevina.*
176 6 from bottom, after "Brot." add: (Lindl. Bot. Reg. t. 1488).
— last line, add: of *Pedrosia.*
178 15, "rich" dele.
— 18, for "*Porto-sanctana*" read: *Loweana.*
— 26, for "*L. macranthus*" read: *P. macrantha.*
— 33, for "that" read: which.
180 26, after "subper." insert: Mad. reg. 1, rrr.
— 27, before "PS." insert: Mad. Pta de S. Lourenço on the Ilheo dos Embarcadores, in one spot only, towards the edge of the S. cliff.
184 8, for "is omitted altogether in his 2nd" read: is only mentioned incidentally under his generic char. of *Ornithopus* in his 2nd ed. p. 209.
191 10 from bottom, after "darker" insert: lilac-b. parallel.
— 9 from bottom, after "lines" insert: Wings and keel w.
192 17, for "de" read: do.
— 19, after "ground" insert: descent into Pto Novo on the road from Funchal to Machico, all down the road below the Fort, borders of cornfields and waste rocky ground.
— 25, for "Fl. 1–4 very," read: Fl. mostly 2–4 very rarely 5.
— 26, for "pale grey or bluish" read: bright lilac-blue. And after "keel" insert: in drying.
— 27, for "v.-black," read: deeper blue.
195 21, " " dele.
— 24, for "Fascic." read: Tom.
— 26, at end, after "ground," add: cornfields.
— 10 from bottom, after "Fl." insert: conspicuous bright lilac or.
— 2 from bottom, after "cal." insert: Standard and wings at first b. then lilac, keel w.

Page line

196 2, before "short" insert: pale.

— 10, the ? after "7" dele.

Obs. In April 1862, i. e. within a few months after writing the present and the following page in the body of this work, I had the satisfaction of establishing completely *E. pubescens* DC. as a Mad. pl. by the discovery of the original proper form of it, *α. subpilosa* Lowe (wholly pubescent with awnless ped.), abundantly in two very remote localities, viz. Machico up the Ladeira above S. Roque on the road to S^ta^ Cruz, and again at Calheta in the Rib. de S. Bartholomeo—in the latter place mixed and entangled with *E. gracile* (Lòisel.), from which it is at once distinguished by its light apple-gr. foliage, low stature (scarcely above 12 in. high), broad lfts. and small pale lilac fl. 1 or 2–5 but mostly 2 on each ped. The standard and wings are pale lilac, the former a little streaked with darker in the middle, the keel w.; the fl. on the whole rather bluer and larger than in *E. hirsutum* L. Ped. *always awnless.* Style short quite smooth; stigma abruptly and distinctly capitate, remarkably globose, subapiculate. Pods linear-oblong. The lower ped. are 1–2-fld., the upper 2–5. Tendrils branched. Whole pl. pubescent light gr., of rather humble growth and suberect, not rampant matted or entangled. Lower and middle stip. strongly semi-sagittate, uppermost simple.

198 11–4 from bottom.

Obs. The existence of *E. tetraspermum* L. as a Mad. pl. still rests solely on this BH. spec. Down to the present moment (Nov. 1868) it has not been found in Mad. by either Capt. Norman and S^r^ Moniz or by myself.

199 28, *Obs.* This ND. pl. might well constitute a var. *β.*

202 18, insert between this and line 19: *γ.* Fl. white.

— 25, after "Serra" insert: Calheta in Rib. de S. Bartholomeo.

— 27, after "valley" insert: *γ.* Mad. "Campanario, Capt. Norman May 1866," Herb. Moniz!

209 1, at end add: pale grey or y.

— 4, for "(purple-violet standard)" read: (i. e. pale pink or lilac standard, deep pink or dark atropurpureous wings, and w. or pale atropurpureous keel).

— —, after "compressed" add: tawny-.

— 5, for "rarely and only accidentally occurs" read: occurs rarely and only accidentally amongst other crops.

210 2, dele ", and after "Ped." add: ii. 330.

— 3, " and "(DC.)" dele.

214 2 from bottom, for "straight margins" read: *straight margins.*

216 27, 28, "substrangulate with slightly sinuate margins" should be in italics.

Page line

222 9 from bottom, after "*multiflorus*" add: Lam., and after "*coccineus*" add: Kniph.

— 5 from bottom, after "and" add: livid-.

223 4 from bottom, transpose "Lindl. in Bot. Reg. t. 830" to end of the following line.

224 13 from bottom, at end add: and as figured by Lindley in Bot. Reg. l. c.

228 22, prefix †††.

230 after line 25, add:

Though Origen was probably misled by the ambiguous word *locustæ* in supposing the pods of this tree to have been the "locusts" (ἀκρίδες) on which St. John the Baptist fed in the wilderness, rather than the insect commonly so called, they were yet assuredly the "husks" (κεράτια) "which the swine did eat" in the parable of the Prodigal Son.

— 27, for "TRICANTHOS" read: TRIACANTHOS.

234 10, after "globose" add: umbilicate.

— 29, after "within" add: fr. smooth pruinose.

— 38, after "globose" add: umbilicate.

236 23, after "less" add: an.

237 19, for "Berries" read: Drupes ½ in. long, ovoidal, not umbilicate.

243 10 from bottom, add:

Since this was written, I have myself seen several bushes in the Curral das Freiras locality above indicated, viz. on rocks at the back of the Pico do Cedro on the path descending into the Curral from the Jardim da Serra, about halfway down. And Capt. Norman has also found "more than 20 bushes, male and female, on high ledges and steeps above the path leading from the Alegria above S. Roque to the W. brink of the Rib. de Sta Luzia."

246 after line 4, add:

According to Boreau (Seem. J. of Bot. i. 286), the Mad. pl. would seem to be not so much the English *P. procumbens* of Sibthorp (=*Tormentilla reptans* L., Smith EB. t. 864, &c.) but rather *P. mixta* Nolte, which, however, he considers not a distinct sp. from his "*P. nemoralis* Nestl. (partly)." But the assigned distinctions seem, I must say, very weak and indecisive.

— after line 18, add:

2. P. REPTANS L.

More or less hairy, sometimes glabrescent; st. *flagelliform creeping stoloniferous* prostrate or procumbent and *early rooting at the joints*; stip. mostly entire, upper only 2–3-cleft or inciso-toothed; *lfts.* 5–7, *mostly* 5, elongato-obovate somewhat *shallowly and bluntly toothed from below the middle, all on long slender filiform petioles; fl. solitary dispersed all along the st. on long slender*

axillary ped. or from the nodes, mostly *pentamerous*; pet. 5, not seldom 6, never 4, obcordate with a short *but distinct claw*; sep. 10–12; carpels "tuberculate" or "granulate."—Linn. Sp. 714; Vill. Dauph. iii. 568; Lam. Dict. v. 595; EB. t. 862; Brot. ii. 350; Pers. ii. 56; Hook. Fl. Scot. i. 163; Sm. E. Fl. ii. 423; DC. ii. 574; Spr. ii. 538; Koch 239; Scub. Fl. Az. 48. no. 361; Coss. et Germ. 175; Gren. et Godr. i. 531; Bab. 93.—Herb. per. Mad. reg. 1, r. Road and roadsides at S. Vicente a little below Dª Vicenzia's Quinta, sparingly; abundantly on banks and by roadsides at Lugar Debaixo and Fajãa d'Ovelha below the church on the S. coast W. of Funchal. April, May 1862, 1863.—Precisely the common English pl. Root strong blackish running deep and wide amongst the stones. St. 1–2 ft. long slender mostly simple rooting from the beginning at the joints. L. on long slender petioles, dark gr., the 2 outer lfts. combined on one short common petiolule. Fl. 6–8 lines in diam. full bright-y., produced singly from the nodes or axils all along the stoloniferous weak or wiry st., which with the petioles (often 4 or 5 in. long), are mostly red or purplish.

I still think it more probable that *P. reptans* of Buch's List was rather the universal *P. procumbens* Sibth. (*T. reptans* L.) than the present rare and local sp., the true *P. reptans* L.

In consequence of the discovery of *P. reptans* L., it may be well to subjoin a more full and amended character of the Madeiran

P. PROCUMBENS Sibth.

More or less hairy and shining; st. flagelliform and often prostrate or procumbent but *not rooting at the nodes or stoloniferous till late in the season*, sometimes diffusely suberect; stip. simple entire or 2–5-cleft; *st.-l. shortly petiolate, lfts.* 3–5, *mostly* 3, obovate-wedgeshaped *deeply and coarsely or strongly and sharply cut-toothed* above the middle, the teeth very *acute and pointing forwards*; *fl. subterminal* on long erect slender ped. *in irregular few-fld. leafy cymes* (about 6 lines in diam.) *mostly tetramerous*; *pet.* 4, very rarely 5, obcordate *with scarcely any claw*; sep. 8, very rarely 10; carp. obliquely 3–4-ribbed or wrinkled on each side.

Of the syn. quoted at p. 245 for the above Mad. pl., the following are referred by Boreau l. c. to his *P. nemoralis* Nestl. (of which he considers also *P. mixta* Nolte a mere form): viz. *P. nemoralis* Nestl. Mon. Pot. 65 "(for the greater part)" and *P. procumbens* Koch 239 "and Auct. excl. syn. Sibth. and Linn."

P. Tormentilla Sibth., Nestl. (*Tormentilla erecta* L., *T. officinalis* Sm. EB. t. 863) may possibly have been overlooked in Mad. It is mainly distinguished from *P. procumbens* by its more erect or diffusely spreading st., perfectly sessile st.-l., much smaller always 4-merous not at all cymose fl. about 4 lines in diam., and smooth even carpels.

Page line
248 4, after *fruticosus*, "L." dele.
— 7, after "355" add: (not Linn.).
254 at bottom, add:

Two small bushes of a Rose, without fl. or fr., but otherwise strongly resembling *R. Wilsoni* Borr. EBS. t. 2723, except that the lfts. are smooth and have the strong fragrance of those of the common Sweet-briar (*R. rubiginosa* L.), were found by me in May 1867, growing in the almost wholly unfrequented path along the Levada dos Lamaceiros above P^to^ da Cruz, about halfway between the little building where the waters are divided and the Rocha furada, under Pico da Suna and at an elevation of above 3000 ft., in a perfectly wild part of the mountains, far remote fromany habitation or even cultivated spot. No other Rose, not even the only native Mad. sp. *R. canina* L., could be found in the surrounding thickets; nor could I find in the only neighbouring villages of S. Antonio da Serra and P^to^ da Cruz, each about 3 miles distant, any Rose at all approaching this, in cultivation. The appearance therefore of these 2 bushes in such an unfrequented and remote locality is at present wholly unaccountable, to whatever sp. they may prove hereafter to belong.—The following description contains all that can as yet be said about them :—

A low small shr. 1-2 ft. high. Branches slender; those of the previous year thickly clothed with crowded long pale or whitish straight horizontal or slightly declining slender subulate spines, a little compressed and extended upwards and downwards at their base; longer fewer or more remote and a little more decurved or declining on the young shoots of the year, the longest being 4 or 5 lines long. A few similar spines occur also on the petioles. Young shoots and older branches alike entirely naked or eglandulous. Petioles thinly sprinkled, stip. thickly, and lfts. less closely ciliate with glands or short (not red) capitate *setæ*. Lfts. 7 broadly oval, 4–9 lines long, 3–7 broad, finely simply or doubly serrulate, more or less fringed with glands, quite smooth above, often a little puberulous and glandulous at the base and up the midrib beneath. Foliage full gr., a little paler beneath.

Page	line	
255	16,	"each" delc.
257	18, 19,	for "this tribe of *Rosaceæ*" read: *Pomaceæ*.
258	7,	at end add: with more or less of the flavour of formic acid.
—	23,	after "high," add: or mostly in Mad. a mere bush, 6-10 ft. high.
261	14,	prefix ††.
—	7 from bottom,	prefix ††.
262	9,	prefix ††.

Part III.

Page line

264 13 from bottom. *Obs.* A ? should be put to this syn. of Lindley; for the leaves are figured pointed as in *P. pomiferum* L. and the fr. as not only depresso-globose but lemon-y. instead of buff or golden-y.

271 5, "*Schufia*" dele.

275 8 from bottom, after "erect" insert: or ascending.

284 16, for "odour of musk" read: rank musky odour.

295 19, add to syn.: Bot. Reg. vi. t. 488.

296 13, *Obs.* The more natural place of Paronychiaceæ, restricted to its proper limits (i. e. excluding the Tribe *Polycarpeæ* which belongs to *Caryophyllaceæ*), is undoubtedly in MONOCHLAMYDEÆ near Amaranthaceæ. See Benth. and Hook. Gen. Pl. i. 144.

297 13, *Obs.* Belongs to Caryophyllaceæ.

300 2, "de" dele.

— 7, add: And, again, the mistake of marking formerly these spec. "*I. cymosum*" probably arose from the misquotation by Linn. for that pl. of Bocc. Sic. 41, t. 20. f. 3, which really belongs to *P. echinata* Lam. See Desf. i. 204.

301 4, for "ovate" read: lanceolate.

— 6, EB. t. 351. *Obs.* Mr. Newbould has pointed out to me that Smith, in a pencil correction on the original drawing by Sowerby for this plate, remarks that the sep. are figured too broad and blunt.

— 24, after "lanceolate" add: or linear-lanceolate.

— 25, after "acute" add: or attenuate.

— after line 29 add:

2. S. perennis L.

Fl. fascicled in crowded or congested leafy tufted cymes at the top of the st., not axillary or loose and spreading in fr.; sep. ovate with a distinct membranous w. border, subobtuse in fr. and always erecto-connivent.—Linn. Sp. 580; Vill. Dauph. iii. 649; Lam. Dict. ii. 763, Ill. t. 374; Fl. Dan. t. 563; Pers. i. 491; EB. t. 352; Sm. E. Fl. ii. 283; Spr. ii. 382; DC. iii. 378; Koch 281; Coss. et Germ. i. 156; Gren. et Godr. i. 614; Bab. 125. *Knawel incanum* &c. Raii Syn. 160, t. 5. f. 1. *Alchimilla* &c. *majori flore* Vaill. Par. 4, t. 1. f. 5.—Herb. ann. Mad. reg. 3, 4, r. "On Pico do Areeiro, P. da Silva and P. Grande; on the latter near the summit, but not on the highest top, plentiful and luxuriant, but generally an inconspicuous mountain-turf pl." Capt. Norman R.N., June 1866.—Root in Mad., and I suspect elsewhere, properly ann. or only abnormally per. (see Hook. Fl. Scot. i. 133 and Coss. et Germ. l. c.), simple fibro-filiform or capillary, very fine and slender, long and tortuous. From its crown spring several (6 in each of my two spec.) slender leafy erect or ascending short jointed st., forming a small close tuft about an

inch high, simple and shortly or congestedly fork-branched only quite at top, furry-pubescent here and there on one side. L. linear acute, connate and subciliate at the base, opposite in pairs, not fascicled, mostly as long as or longer than the internodes, erecto-patent or recurved. Fl. numerous in leafy crowded or congested terminal cymes, not lax or spreading in fr., gr. inconspicuous. Styles 2. Sepals always erect subconnivent coarsely or strongly 3-ribbed, gr. but distinctly though narrowly bordered with w., ovate acute or subobtuse especially in fr., about as long as the urceolate obsoletely but broadly or bluntly 10-ribbed tube or hard indehiscent smooth 1-celled 1–"2"-seeded caps., unchanged in fr. except in being a little more obtuse and connivent.

Page line
301 30, 31, *Obs.* Remove to CARYOPHYLLACEÆ.
302 15, *Obs.* PORTULACACEÆ, exclusive of *Tetragonia* and *Aizoon*, are placed by Benth. and Hook. (Gen. i. 155) immediately after CARYOPHYLLACEÆ.
303 4, *Obs. Tetragonia* and *Aizoon* are removed to MESEMBRIANTHEMACEÆ by Benth. and Hook. (Gen. i. 156–852).
312 15 from bottom, add to syn. Bot. Reg. t. 1807.
320 9, for "crowned" read: radiately beset.
— 26, after "bristles" add: but spirally encircled with more or less regular whorls of spreading or drooping lanceolate fleshy l., often an inch long (the limbs or points of the sepals), deciduous or withering as it ripens.
322 8 from bottom, add: i. e. *Lagartixa.*
323 last line, add: though indeed Hudson's pl. itself (= *U. erectus* DC.) was probably also only another form or var. γ of the present sp.
324 6 from bottom, add: i. e. *Lagartixa.*
326 18 from bottom, after "Mad." add: reg. 2, 3.
327 17, after "Mad." add: reg. 1, 2.
336 9, before "stiffness" insert: smoothness.
337 5 from bottom: *Obs.* I found it in fl. abundantly semi-naturalized on garden walls on the outskirts of Vigo, Jan. 10th 1864.
339 11 from bottom, for "Guelder" read: Gueldre.
— 10 from bottom, for "*Hortensia*" read: *Hydrangea.*
341 25, at end add: (except in *Hydrocotyle* L.).
346 9, add: Umbels compound perfect.
358 15, after "16" add: ibid. ed. 2 (1816) i. 74, t. 333.
361 12 from bottom, after "3" add: Brot. Phyt. Lusit. i. 91, t. 40.
362 12 from bottom, add to syn.: BM. t. 5670.
364 14, at end add: and developes one or even sometimes two side leaf-buds, which are produced in continuation of the main st.
— 15, after "rarely" add: curved or.
365 2, after "*Cenoula*" add: or *Cenoura.*

Page line

365 3, add to syn.: BM. t. 5724.

367 21, before "*D. aureus*" insert: *D. halophilus* Brot. Phyt. ii. 198, t. 168. *Obs. D. maritimus* With. (not Lam.). EB. t. 2560, seems to differ from this in little but the absence of the central dark abortive fl.

372 1, for "invisible" read: concealed.

376 2 from bottom. *Obs.* Dr. Seemann (Journ. of Bot. ii. 305, 307) distinguishes this and the Canarian Ivy from the common European *H. Helix* L. by the cordate (instead of ovate or elliptic) uppermost l., panicled (not simple) rac., and above all by the 13–15- (instead of 6–8-)radiate furfuraceous starry pubescence of the pedic. and cal., under the name of *H. canariensis*, Willd.

377 12, for "style simple pointed" read: styles concrete or combined into a single short cone or column.

Part IV.

379 6, after "Stamens" insert: mostly.

— 10, after "*superior*" add: *Stamens epigynous or perigynous.*

— 5 from bottom, for "Guelder" read: Gueldre.

380 20, for "Guelder" read: Gueldre.

381 14, for "de Madeira" read: da Ribeira.

— 16, for "de" read: da.

382 20, for "P^{co} da Cruz" read: P^{to} da Cruz.

383 19, for "sometime" read: sometimes.

396 7, after β. insert: *Vaillantii*=.

398 8 from bottom, for "Sao Nicolao" read: São Nicolão.

— 7 from bottom, for "Chao" read: Chão.

409 13, for "P. Juliana" read: P. de Juliana.

428 15 from bottom, after "cancellate" add: and recept. very rarely chaffy.

— 7 from bottom, after "plumose" add: Recept. sparingly chaffy.

433 2 from bottom, for "P^{co}" read: P^{to}.

445 16, after "Mount" add: comma.

446 10, for "corymbs" read: cymes.

457 3, *Obs.* In Mad. spec. from the same locality since obtained, the ach. are exactly as described from English.

468 18, for "Sylva" read: Silva.

470 17, *Obs.* The fig. is not perhaps absolutely "bad;" but it represents an unusually large luxuriant state of the pl. such as I have never seen. Webb's own expression l. c. is, "exceedingly defective."

472 26, for "*Feiteirinha*" read: *Feteirinha.*

481 7, after "Masson," add: who passed on from Mad. first to Tenerife and thence to the Cape.

Page line

483 15, after "(*nivea*)" add:—On the Penedo do Saco, P^ta^ de S. Lourenço, towards the edge of the N. cliff, I found (March 10th 1868) several bushes of this var. differing from others of both *α* and *β* by their dwarf low thickly and compactly bushy habit, being not more than 6–12 in. high, their short numerous interlacing thickly leafy branches, clammy greyish or silvery-green foliage, and l. so thinly silky-cobwebby or cottony as to show the 3 nerves, prominently beneath, and even above not indistinctly as 3 depressed fine lines. The cymes scarcely rise above the mass of foliage, and are very dense compact and close with short thick ped. and branches. Outer or lower scales of inv. rose-purple at their base. Outer female flts. and their prominent recurved or revolute linear stigmas dark dull purple; inner perfect flts. prominent above the outer, deep chrome or orange-y. like the copious pollen. As a mere maritime form of *β*, it is remarkable that the l. are less instead of more tomentose, and that the habit is so different from equally maritime states of *β* on sea-cliffs of the N. coast at the Passo d'Area and of *α* everywhere.

491 3, after "*Salmantica*" add: *Nauplius* from *Paulinus*.

498 7, at end add: *Alcachofe*.

504 20, for "Allegria" read: Alegria.

507 14, "*de*" dele.

513 29, add to syn: Bot. Reg. t. 170.

520 27, "Mad." dele.

Part V.

527 22, for "Arribentão" read: Arrebentão.

554 8, 9 from bottom, dele: and instead read:

On a late fresh examination and consideration of Brotero's fig. and description of his *Crepis intybacea*, for which I am much indebted to my friend Dr. Hooker, I am more inclined than formerly to refer to it my Mad. *C. laciniata*. Both pl. seem to be equally common and to affect similar soils and situations in both countries; and such a universal weed by roadsides and in rich moist cult. ground in Portugal might well be expected, and indeed could scarcely fail to have been introduced and to flourish in vineyards and waste ground amidst cultivation everywhere in Mad.,—a condition precisely fulfilled by *C. laciniata*. The fig. too may fairly represent a dwarfish few-fld. pl. of *C. la-*

ciniata a, with the root-l. runcinato-pinnatifid; the rib or keel moreover of the inner or longer involucral scales in *C. intybacea* is described as "ad usque medium mollibus aculeolis fuscis scabra;" and though the root-l. are said to be "interdum utrinque hirsuta," yet Brotero (p. 58) expressly distinguishes it "a *Cr. taraxacifolia* præsertim caule erecto superne foliato, nec scapis adscendentibus basi solum foliosis, foliis radicalibus sæpe runcinatis oblanceolatisve glabris, nec omnibus runcinato-pinnatifidis hispidis." Hence the Portuguese pl. of Brotero is certainly no mixture with *C. taraxacifolia*.

On the whole however, without careful examination of the Port. pl. comparatively with the Mad., it is better to retain the latter provisionally as distinct.

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PRINTED BY TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET.

A MANUAL FLORA

OF

MADEIRA.

VOL. II.—PART I.

Subclass III. COROLLIFLORÆ (*continued*).

Sect. B. Cal.-tube free or rarely and then only partly adnate at the base or downwards to the superior ov.; limb inferior or very rarely (*Samolus*) half-sup. *Cor. inferior* or at most half-superior. *Stam. mostly perigynous and epipetalous or inserted on the cor., rarely almost or quite free and hypogynous.*

Order LI. ERICACEÆ.

The Heath, Arbutus and Rhododendron Family.

Fl. perfect, mostly regular. Cal. wholly free persistent 4–5-partite, lobes distinct or only subcoherent at the base. Cor. hypogynous mostly gamopetalous and 4–5-fid, sometimes 4–5-partite or even 4–5-petalous, often persistent or marcescent, mostly regular, imbricate in bud. Stam. as many or twice as many as the lobes of cal. or cor., 1–2-seriate, mostly free and hypogynous or inserted with the cor. on an hypogynous disk below the ov., rarely subepipetalous or slightly adnate to cor. at its base; anth. 2-celled, the cells opening by a terminal pore or slit, not horned at top but appendiculate or caudate sometimes at the base. Ov. superior free of 4–5 and 1–many-ovulate carpels. Style filiform, stigma capitate. Fr. capsular rarely baccate, cells 4 or 5 mostly many-seeded bursting loculicidally and septicidally with 4, 5, or 8–10 valves. Seeds mostly numerous minute pendulous from the central placentæ, scrobiculate; embryo straight axile in the fleshy albumen; radicle superior near the hilum.—Subarborescent shr. with mostly evergreen rigid alternate entire sessile rarely opposite or whorled l. without

stip. Fl. more or less conspicuous w., pink or purple, rarely b. or y., mostly scentless.

Tribe I. *ERICEÆ.*

The Heath Tribe.

Cor. marcescent 4- very rarely 5-merous. Stam. hypogynous mostly free. Fr. dry capsular mostly loculicidally dehiscent.—Evergreen shr. or undershrubs, rarely subarboreous. Buds naked.

1. ERICA. Cal. 4-partite rarely 4-fid, herbaceous or coloured. Cor. gamopetalous 4-lobed or 4-toothed much longer than the cal. Stam. 8 free very rarely submonadelphous. Caps. 4-celled loculicidally dehiscent at the middle of each valve. Seeds in each cell numerous.—European or chiefly S. African shr. (very rarely tr.) stiff dry rigid much branched with acerose or stiff linear revoluto-marginate crowded l. Fl. mostly drooping on short 3-bracteolate 1-fid. pedic., axillary or terminal.

Tribe II. *ANDROMEDEÆ.*

The Andromeda Tribe.

Cor. deciduous 5- very rarely 4-merous. Stam. mostly free, hypogynous. Fr. capsular loculicidally dehiscent.—Shr. or undershrubs, rarely tr., mostly evergreen. Buds almost always scaly.

2. CLETHRA. Cal. 5-partite persistent. Cor. deeply 5-partite almost 5-petalous, the lobes obcuneate or obovate-oblong. Stam. 10, fil. smooth flattened and adnate to the pet. at their base; anthers 2-caudate presently inverted. Style triquetro-filiform 3-fid; stigmas 3 subcapitate. Caps. 3-celled. Seeds numerous fungosely angular or winged.—Tr. or shr., all American except *C. arborea* Ait. L. alternate oval or oblong toothed or entire mostly evergreen. Fl. w. in simple or panicled rac. with caducous br.

Tribe I. *Ericeæ.*

1. ERICA L.

* *Stamens included.*

a. Anthers caudate.

1. E. CINEREA L.

Suffr., branches somewhat loosely erect or ascending minutely puberulous; l. ternate crowded smooth shining bright gr. narrow-

linear subobtuse; fl. rose-purple moderately large subcernuous or suberect in small terminal umbels or corymbs at the ends of the branches and short side-branchlets forming a narrow elongate dense thyrse or panicle; pedic. nearly or quite as long as cor. purpurascent subpuberulous 2–3-bracteate at top, br. smooth gr. leaf-like unequal shorter than the smooth membranously bordered subpurpurascent lanceolate very distinct lobes or sep.; cor. about twice the length of sep. ovate-oblong or cylindric-urceolate with short recurved lobes; anth. 2-caudate, the awns serrulate or cristate; style shortly exserted, stigma capitato-peltate; caps. smooth.—Linn. Sp. 501; Fl. Dan. t. 38; Lam. Dict. i. 482; Brot. ii. 23; Pers. i. 423; EB. t. 1015; Hook. Fl. Sc. i. 119; Sm. E. Fl. ii. 226; DC. vii. 665 and *β. maderensis* 666; Spr. ii. 183; Koch 548; Coss. et Germ. i. 236; Gren. et Godr. ii. 431; Bab. 214; Willk. et Lange ii. 344.—Suffr. per. Mad. reg. 4, rrr. In rocky clefts or hollows on the craggy summits of the highest central peaks, especially about P. do Areeiro; but sometimes straggling down below them here and there, as at the bottom of the Voltas in the Curral das Freiras and (S^r J. M. Moniz) "up the Caminho do Meio and about the Jardim da Serra." Rock on the N. side of the Paul da Serra called the Cabo da Rib. de João Delgada. "Summit of Pico Ruivo," T. V. Wollaston Esq. July.—Low and thickly bushy, not above 1 ft. high, with usually in Mad. long decumbent diffusely spreading or procumbent or even sometimes trailing branches, often in exposed places with the younger shoots or branchlets bent and twisted in upon themselves. L. 3 lines long stiff but very fine and narrow, at first ternate, presently fasciculate. Fl. very numerous and elegant, varying from light pink to full deep rose or rose-purple, never in Mad. w., scentless. Cor. more oblong than ovate, 2–3 lines long and half as broad, a little constricted close below the 4 broad shallow segm. of the limb.

I can perceive no stable difference whatever to warrant DC.'s separation of the Mad. pl. as a var. from the British or European.

2. E. ARBOREA L. *Urza* (*Urze*) *mollar* or (at Machico and P^{to} da Cruz) *Betouro.* **Tree Heath.**

Arboreous, branches and branchlets very erect straight virgate, the latter closely pyramidally tufted w. or cinereous and thickly hispid or furry as if hoar-frosted with short unequal spreading hispidulously or spinellosely roughened pubescence; l. 3–4-nate crowded smooth dark gr. short narrow-linear obtuse; fl. w. rarely with a blush or pale rose tint, small cernuous in small drooping umbels or corymbs at the ends of the short side-branchlets only, forming broad thick brush-like thyrsoidal

panicles below the extreme ends of the branches; pedic. mostly shorter than the cor. dark red or purple smooth 3-bracteate at the base, br. pale cream-col. smooth ovate, like but narrower and smaller than the sep.; cor. about twice the length of the ovate or oblong-ovate sep. narrowly campanulate, open and not constricted at top below the 4 short broadly half-ovate more or less obtuse erect lobes; anthers shortly 2-caudate, awns or auricles short broad ligulate minutely serrulate or subciliato-denticulate; style thick shortly exserted, stigma large peltate; caps. smooth turbinate short and thick.—Linn. Sp. 502; Lam. Dict. i. 479; Desf. i. 328; Pers. i. 421; Buch 193. no. 207; Spr. ii. 195; DC. vii. 690; Fl. Gr. t. 351; WB. iii. 13; Koch 548; Gren. et Godr. ii. 432; Willk. et Lange ii. 346.—Tr. or subarb. per. Mad. reg. 3 and upper part of 2, cc. Everywhere above 1000 ft. where any native wood remains, but largest from 4000 to 5500 ft. as on Pico Ruivo, in the Serra d'Agua, Boa Ventura, Paul da Serra (flanks of), Serra do Seixal, Cerca at S. Antonio da Serra, &c. where trees were commonly seen 20 or 30 years ago 30–50 ft. high with trunks 2–6 or even 7 ft. in circumference. March, Apr.—Varying from a tall shr. 6 or 8 ft. high to a tree of mostly 20–30 ft. with a distinct mostly straight and subcylindric trunk and pyramidally bushy head of a peculiarly dark gr. with erect straight virgate branches, naked below, ending in erect pyramidal leafy densely crowded tufts or fascicles of slender laterally flowering branchlets, clothed with a w. or hoary pubescence of which the longer stouter hairs are minutely feathered or echinulately hispidulous all round, with a shining silky lustre. Foliage densely crowded dark gr. somewhat soft or at least not harsh and rigid. L. linear ½–1 mill. broad, 4 or 5–10 long obtuse quite smooth. Fl. very numerous but small and inconspicuous, 3 mill. long, 2 broad, in little distinct terminal umbels or corymbose bunches of 3–5 together, pure w. or very rarely tinged with blush, fragrant like hawthorn, discharging when the branches are abruptly struck or shaken clouds of w. or greyish pollen. Anth. with a short flat auriform or strap-shaped obtuse minutely subciliato-denticulate vertically pendent auricle rather than awn at their base of a light or deep pink col. Style smooth w. thick exserted 1 mill. beyond cor. Stigma gr. with a pink or red border or rim and 4 pink or red dots set cruciately in the middle. Caps. 2 mill. long, 1½ broad, truncate at top or turbinate.

This has been perhaps one of the most generally serviceable of all the indigenous forest-growth of Madeira. The timber of the larger trees is extremely hard and tough, and useful for a great variety of purposes—though, when sawn into planks, very liable to warp and split, which prevents its being much employed

in cabinet or finer sorts of housework, for which its handsome light salmon-colour, streaked and rayed with darker cinnamon-red, would otherwise recommend it. It is also used for making troughs, bowls, spoons, &c., being very durable and proof against moisture. The stronger and thicker st. make excellent stout "*bordoens*" or hammock-sticks; and the long slender virgate stems of the smaller or younger shr. were also formerly the favourite material for the poles (*varas*) used to support the French bean(*Feijão*)-pl. in the north; affording also, with the root-stocks, the best and most lasting fuel (*lenha*); whilst the terminal leafy finer boughs and twigs or top shoots yielded when dry the best brushwood (*queima*) for kindling or heating ovens; though now indeed, owing to the yearly reckless destruction of the native forests, recourse is almost everywhere becoming necessary for all these purposes to what is called in Mad. "the Lisbon Pine" (*Pinus Pinaster* L.). Another use for the young fresh green tops of the branches which I can from personal experience commend, is that of forming a dry elastic clean and scentless substratum for a bed or mattrass in encamping on the mountains.

b. Anthers ecaudate.

3. E. SCOPARIA L. *Urza* (i. e. *Urze*) *durazia.*

Suffr., shr. or subarborescent mostly bushy, branchlets erect smooth cinnamon-brown or reddish; l. 3–4-nate not fascicled, stiff rigid very smooth and shining bright gr. linear subobtuse; fl. inconspicuous pale yellowish gr. more or less tinged especially above with dull red or rose-purple, rather small cernuous solitary or 2–3-nate in the axil of each leaf towards the ends of the branches and branchlets, forming subunilateral rac. collected into brushlike thyrsoidal terminal panicles; pedic. mostly shorter than the cor. smooth 2–3-bracteolate about halfway up, sometimes dark dull reddish, br. minute; sep. broadly ovate smooth united halfway up, $\frac{1}{3}$ length of cor.; cor. subglobose or globoso-campanulate open and not constricted at top, lobes broadly ovate or triangular half the length of tube; anth. simple included or shorter than cor.-lobes, dark dull reddish brown or purple; stigma large peltate subquadrangular or 4-lobate subexserted beyond the tips of the cor.-lobes, dark dull red; caps. . . . . .—Linn. Sp. 502 (partly); Vill. Dauph. iii. 515; Lam. Dict. i. 479; Brot. ii. 21; Pers. i. 423 (partly); Spr. ii. 192; DC. vii. 692; WB. iii. 14; Coss. et Germ. i. 237; Gren.

et Godr. ii. 433; Willk. et Lange ii. 346. *Erica fucata* Thunb. "Diss. no. 9" (DC.). *E. fucata scoparia* Buch 194. no. 208. *E. azorica* α et β Seub. 40.—Shr. or subarb. per. Mad. reg. 2, 3, ccc; PS. reg. 4, r. In Mad. everywhere, but scarcely below 1500 ft. on the S. side of the island, though descending in the N. much lower. Its upper limits are on the whole rather lower than those of *E. arborea* L., e. g. on the N. ascent of Pico Ruivo, the middle region is filled with the two growing intermixed: but *E. scoparia* ceases presently, whilst *E. arborea* becomes larger and more luxuriant on approaching the summit. P^to^ S^to^ only on the highest peaks, P. do Facho, P. do Castello, &c. Apr.–June.—Seldom exceeding 5 or 6 ft. in height even in thickets, and in open places usually much smaller and forming a low thick bush, but occasionally rising into a tr. 15 ft. high, with a trunk 1 ft. in diam. Foliage shining bright gr. rigid. Branchlets or young shoots bluntly 3-ribbed or angular; sometimes very minutely subpuberulous, but mostly quite smooth. L. shining gr. on both sides, hard and harsh or stiffish, very caducous in drying or even on the pl. in hot dry weather. Fl. small inconspicuous 2 mill. long, 2 broad, scentless herbaceous or pale gr. tinged or streaked chiefly on the upper side and lobes with (Indian) red or rose, globose in bud, each on its proper pedic. forming crowded subunilateral leafy rac. Anthers and stigma dark crimson or dull brownish red or atropurpureous, the former included, not longer than the tube, the stigma scarcely exserted beyond the tips of the lobes of cor.

Much used as brushwood for heating ovens, kindling fires, &c., but not usually attaining size enough to be serviceable for other purposes, except sometimes for rods or varas for French beans (*Feijoens*).

Tribe II. *Andromedeæ*.

2. Clethra L.

1. C. arborea Ait. *Folhado* or *Folhadeiro*.

L. oblong or oblong-lanceolate acuminate at each end, sharply and finely serrate, reticulate, with the nerves rusty-pubescent or subvillose beneath; rac. paniculate terminal rusty-villoso-pubescent; br. minute deciduous; stam. included.—Ait. Hort. Kew. (ed. 1) ii. 73, (ed. 2) iii. 57; Vent. Malm. 40; BM. t. 1057; Buch 194. no. 209; Spr. ii. 316; DC. vii. 589; WB. iii. 12.—Arb. Mad. reg. 3, cc. Woods and thickets in ravines everywhere from 2000 to 5000 ft.; Rib. Frio, da Metade, all the ravines in the north from P^to^ da Cruz to Rib. da Janella; also frequently planted about cottages and in pleasure-grounds and

gardens down to 1500 or 1000 ft. Aug.–Oct.—A small evergreen tr. 15–25 ft. high with compact bushy pyramidal or oblong head and straight trunk rarely more than 6 in. in diam. covered with a rugged greyish brown or ash-coloured bark. The tr. is at once distinguishable amongst others by the bright red petioles and peculiar light gr. of the young l. Petioles, young branches and nerves of l. beneath rusty-pubescent like the mainstem of the panicle, rachis of rac., pedic. and cal. Petioles ½–1 in. long slender and with the lower part of the midrib and the young shoots dark bright red or reddish. L. 3–5 in. long, 1–2 in. broad stiffish but not coriaceous, shining dark gr. and smooth above, paler and glabrescent beneath and finely reticulate with the principal nerves always more or less rusty-pubescent. Panicles terminal not rising much above the terminal tufts of l. Fl. snow-w. and very elegant in long loosely spreading unilateral rac. 3–6 in. long forming a depressed or short panicle, fragrant like Friar's Balsam; rachis and pedic. straight slender rusty-villoso-pubescent like the small inconspicuous br. which fall before the fl. expand, pedic. 2–3 lines long; sep. 2 lines long broadly ovate or oval velvety-pubescent subciliate. Pet. reaching 3 lines beyond the sep. broadly obcuneate subbilobed or emarginate distinct not laterally imbricate, falling separately, each with 2 stam. attached to its base, the base of the limb or throat inside villose. Stam. 10 attached in pairs to quite the base of pet. and deciduous with them. Anth. apiculate or shortly cuspidate y., dark rich chestnut at the tip, presently inverted; cells distinct opening by an oblique and at first basal pore, each shortly acuminato-cuspidate at the tip or (ultimately) base; fil. smooth flattened scarcely longer than the anth. Style persistent simple smooth triquetrous slender, the length of the pet. trifid; stigmas subcapitate. Ov. densely villose. Caps. 3-celled subtrigonal subdepressed brown silky-pubescent loculicidally dehiscent dry, the septa separating from the axis. Seeds 1 in each cell pendulous from the top of the axis, mostly abortive.

The wood of the Folhado has no particular quality to recommend it. But the straight young tr. or saplings make admirable walking-poles (*hasteas*) for which purpose they are universally employed, combining with great lightness, toughness, strength and elasticity.

Order LII. TERNSTRŒMIACEÆ.

The Camellia or Tea Family.

Fl. regular perfect, rarely imperfect or diclinous. Cal. mostly 5-, rarely 4 or 6–7-sepalous, sep. free or coherent and subadnate

with the ov. or cor. at the base, imbricate. Cor. hypogynous mostly subgamopetalous; pet. mostly 5 rarely 4–9, mostly a little coherent at the base, strongly imbricated or contorted. Stam. indefinite, sometimes as many or twice as many as pet. hypogynous or subperigynous i. e. adnate to pet. and to each other at the base. Anthers erect or versatile introrsal exappendiculate. Hypogynous disk 0. Ov. free or partly immersed in the torus or fleshy concrete base of cal. 3–5-, rarely 2–many-celled. Ovules pendulous sometimes erect. Styles as many as cells of ov. free or partly connate, stigmas simple. Fr. fleshy or woody and indehiscent or capsular and dehiscent. Seeds few or many pendulous from the central often permanent placenta; embryo cylindric mostly amphitropal rarely straight; alb. mostly little or 0, rarely copious fleshy; radicle various in form and direction upwards or downwards towards the *hilum*; cotyled. mostly small or narrow, rarely broad and flat.—Tr. or shr. L. mostly alternate simple coriaceous evergreen. Stip. 0 or minute and caducous. Fl. axillary solitary or racemose, rarely paniculate, subconspicuous or middle-sized.

TERNSTRŒMIACEÆ are assuredly more closely allied to EBENACEÆ than to CLUSIACEÆ (*Guttiferæ* DC.), with which they have been hitherto associated; and their transfer to this position amongst the COROLLIFLORÆ from the THALAMIFLORÆ has the advantage of bringing them also into proximity with ERICACEÆ and SAPOTACEÆ, to the former of which they approach through *Saurauja*, *Visnea* and *Clethra*, whilst through *Eurya* they have at least as much affinity with the latter as with HYPERICACEÆ or DIPTEROCARPACEÆ &c.

Tribe I. *TERNSTRŒMIEÆ.*

Fl. perfect. Pet. imbricate. Stam. subperigynous adnate to cor. at base. Anth. erect. Fr. rarely dehiscent. Seeds mostly few pendulous or laterally affixed; embryo amphitropal curved or hooked; alb. fleshy, rarely copious; cotyled. linear shorter than the radicle.—Tr. or shr. L. simple. Ped. axillary 1-fld. Fl. w.

1. VISNEA. Cal. 5-fid; sep. combined and adnate with the ov. at the base, persistent. Pet. 5 coherent at the base caducous. Anth. smooth. Ov. nearly free scarcely at all immersed in the torus or fleshy base of cal. Styles 3. Ovules 2–4 in each cell pendulous. Fr. half-immersed in and connate with the fleshy base of cal., involved in the persistent sep.; alb. copious surrounding the embryo.—Fl. rather large bracteate w. fragrant.

Tribe I. *Ternstrœmieæ.*

1. Visnea L. fil.

1. V. mocanera L. fil. *Mocano.*

The only sp.—Linn. fil. Suppl. 36, 251; Lam. Dict. iv. 208; Willd. Sp. Pl. ii. pars ii. 926; Pers. ii. 19; Spr. ii. 465; Hook.! Icon. iii. t. 253; WB. ii. 145, t. 69 B; Johns. in Hook. J. of Bot. ix. 161.—Arb. Mad. reg. 2, rrr. From S. Vicente to P^to^ Moniz on the N. coast on steep banks and perpendicular rocks from 500 ft. to about 1500 ft. in all the principal ravines (Rib. do Inferno, de João Delgada, do Seixal, Rib. Fundo and Rib. da Janella) but chiefly in Rib. Fundo and never seen to the E. of S. Vicente: first observed "on rocks at Seixal, July 1856" in fruit by S^r^ J. M. Moniz, from whom I received it in the following Sept. I have since frequently found or obtained it in fl. or fr. at the mouth of the Rib. do Inferno (Fajãa da Vinha) or of Rib. Fundo on the cliff-road to Rib. da Janella. Fl. Dec.–March; fr. July. —Properly a large not very lofty tr. with a short thick knotted rugged trunk and bushy head of subdiffuse widespreading branches; though now in Mad. scarcely existing but as a low bushy tr. or shr. 6–12 or 15 ft. high, with the short st. or trunk not thicker than the arm or leg. Foliage evergreen and copious, but light and tressy, like that of *Ficus comosa* Roxb. and of a paler or brighter gr. than usual from the light col. of the l. beneath. Petioles short 1–2 lines long, whilst young hairy like the young shoots and l., often reddish. Stip. very minute linear hairy evanescent. L. elliptic, acute at each end, sharply and finely serrulate, 1–2 or $2\frac{1}{2}$ in. long, $\frac{1}{2}$–1 in. broad, at first hairy especially at the edges and on the midrib beneath, finally glabrescent, shining bright full gr. above, paler beneath with the midrib mostly ferruginous or reddish brown like the strongly and sharply angular young twigs or branches. Fl. axillary, solitary (rarely binate or ternate) cernuous bell-shaped mostly unilateral or secund along the branchlets, about the size and with the fragrance (though with a slight fetid after-scent) of those of Lilies of the Valley (*Convallaria maialis* L.), pure w., 2–3 lines long; smaller but otherwise in shape or form resembling those of *Sollya heterophylla* Lindl. Pedic. short, 2 lines long, hooked ferruginously subpubescent, with one or two minute inconspicuous adpressed bractlets mostly at base of cal. but sometimes lower down or at the base. Sep. 5 unequal ovate more or less rusty-pubescent and obtuse, stiff, leafy, gr., erecto-patent, laterally imbricate, closed in fr., persistent. Pet. 5 distinct but slightly connected at the base and inserted at the junction of the sep. with the ovary, about twice the length of sep., erect, loosely imbricate, 2 or 3 apiculate or pointed, the rest

retuse or notched, pure w., thickish or leathery, completely though shortly united quite at their base, so as to fall off as a monopetalous cor. together with the 10 stam., which are very shortly adnate in pairs to their base inside and to each other in a single ring or row. Anth. small 2-celled erect apiculate not awned, the fil. or connective produced into a short point. Ov. conoidal or half-ovate ferruginously villous smooth and shortly ribbed or sulcate at the base, 3-celled, cells 3–2-ovulate, ovules pendulous amphitropal. Styles 3 simple smooth gr. subspirally twisted. Fr. half inferior slightly fleshy and berrylike but dry and scarcely eatable, black, shining, about 4 lines long or broad, globoso-turbinate, the upper half covered by the thickened adpressed persistent sep., the lower immersed and concrete with the fleshy base of cal., 1–2-celled, 1–3- or 4-seeded. Seeds rather large obversely triquetropyriform hard finely granulate. Embryo slender cylindric curved like a fish-hook within the distinct fleshy albumen, the radicle (forming the shank) straight erect superior, twice as long as but of the same diam. and continuous with the narrow linear semicylindric cot. (forming the crook), all very much as in *Cneorum pulverulentum* Vent. (belonging to the Family SIMARUBACEÆ) as fig. by WB. t. 66 B, except that the cot. are much shorter instead of longer than the rad., and that the latter is erect and straight, the whole embryo being merely hooked downwards, not curved throughout.

In Tenerife and Grand Canary this tr. occurs but sparingly or locally, and in the eastern islands of Lanzarote and Fuerteventura it is not found at all, the value of its wood having no doubt led to its extinction. But on the north coasts of Palma, Hierro and Gomera, in precisely similar conditions of locality as those under which it grows in Mad., it still flourishes abundantly up to an elevation of about 2500 ft.; and in the district called El Golfo in the north of Hierro, about a quarter of the way up the zigzag road called Las Vueltas above La Lapa, I saw, Feb. 19th 1858, 3 tr., growing close together by the road, which measured respectively, 3 ft. from the ground, 9 ft. 11 in., 12 ft. 7 in., and 17 ft. 2 in. in circumf. These noble tr. were in full vigour and grew very much like large old tr. of the Carob (*Ceratonia Siliqua* L.) with short rugged gnarled and knotted trunks not above 10 or 12 ft. high before branching, and of nearly equal circumf. throughout, with a vast spreading umbrageous thickly bushy head, and altogether of a most picturesque and handsome aspect. The wood is in great request for its strength and dura-

bility, and was said on the spot to be as hard as but less heavy than that of the "Carrisco" or "Palo branco" (*Notelæa excelsa* (Ait.)).

Webb relates that in the Canaries a syrup is made from the fr. and occasionally used as an astringent medicine. In Mad. the fr. is quite neglected and scarcely eaten even by children, being dry with little sweetness and merely an astringent flavour.

Visnea has assuredly, as remarked by Mr. Johnson, some affinity with *Clethra*; but certainly not enough to warrant its removal from TERNSTRŒMIACEÆ to ERICACEÆ.

EBENACEÆ. Distinguished from *Ternstrœmiaceæ* by little but the normally diclinous or rarely perfect gamopetalous 3–7-lobed fl. and mostly straight or slightly hooked embryo with foliaceous ovate cot. and cartilaginous alb.—A Mad. spec. of *Diospyros Lotus* L. from the garden of the S^ta^ Clara Convent occurs in the Banks. Herb. and is included in Fydell's MS. Mad. List though not mentioned in Von Buch's. There was also, in 1830, a small pl. of it in the garden of the late Rob. Page Esq. K.T.S. at the Mount. But there is no ground at all for supposing it to have ever been indigenous to Mad.

Order LIII. AQUIFOLIACEÆ or ILICACEÆ.

The Holly Tribe or Family.

Fl. regular perfect or imperfect (diclinous or polygamous). Cal. 3–6- (mostly 4–5-)fid or toothed, imbricate in bud, mostly persistent. Cor. hypogynous deciduous, mostly gamopetalous, lobes or pet. 4–6 mostly 4 or 5 and connate at the base, rarely free, imbricate. Stam. definite 1-seriate, as many or rarely twice as many as, alternate with, and mostly adnate to the pet. at their base or subperigynous. Anth. erect introrsal exappendiculate. Hypogynous disk 0. Ov. free 2–many-celled; style 0 or very short; stigma sessile or subsessile, lobed, discoidal or capitate; ovules anatropal 1–2 in each cell, pendulous, funicle sometimes cup-shaped. Fr. a thinly fleshy 2–many-pyrenous *pome*; pyrenæ 1-seeded bony. Seed pendulous anatropal; embryo very small straight at the top of the abundant fleshy albumen; cot. small; radicle superior.—Evergreen mostly smooth tr. or shr. with aqueous astringent viscid juices and hard or at least close w. wood. L. coriaceous alternate simple, without stip. Fl. small w. dichotomously cymose or single on solitary or aggregate axillary ped. Fr. small berry-like globose.

1. ILEX. Fl. mostly perfect. Cal. small 4–5-fid persistent. Cor. gamopetalous 4–5 or 6-partite rotate; the lobes obtuse. Stam. as many as the lobes of cor. and adnate to its short tube; anth. oblong. Ov. sessile subglobose 4–8-celled; style 0 or short and thick; stigma lobed, lobes as many as cells of ov. Fr. globose 4–8-pyrenous.

1. ILEX L.

Holly.

1. I. AZEVINHO Sol. *Azevim* or *Azevinho.*

Arb.; branches erect and proliferously umbellate throughout; l. small obsoletely nerved and veined, ovato-elliptic or lanceolate, subacute at each end, mostly less and rarely more than half as broad as long, unarmed at the tip and mostly quite entire at the edges; petioles moderately long; fl. in aggregate or single axillary and terminal distinctly stalked fork-branched leafless cymes towards the top of the last new shoots, shorter than the l.; their branches after flowering all marcescent and deciduous ultimately from their stalk or axis, leaving for fr. only the single central or axile fl.; fr. persistent, always solitary on simple mostly subelongated ped. always much longer than the petioles, sparingly aggregate or clustered towards the upper part or top of the old penultimate shoots; not cymose.—Sol.! MSS. in BH.; Fydell's MS. Mad. List no. 86. *I. æstivalis* Lam. Dict. iii. 147? Pers. i. 151? Buch Mad. List 198. no. 422. *I. aquifolium* γ (not δ as quoted by DC. ii. 14. no. 2) v. *I. balearica* Hort. Reg. Lam. Dict. iii. 145? *I. balearica* "Desf. Arb. (1809) ii. 262"? Spr. i. 494? DC. ii. 14. no. 2? Holl's List in J. of Bot. i. 20. *I. maderensis* Willd. Enum. Suppl. (1813) 8 (ex Link sec. DC.) name only without descr. (not *I. maderiensis* Lam.). *I. canariensis* Poir. Suppl. iii. (1813) 67; DC. ii. 14. no. 4; WB.! ii. 137. t. 69. *I. Perado* Buch Can. List 157. no. 518 and p. 183. no. 75 (not Ait.).—Tr. or subarb. per. Mad. reg. 2, and lower part of 3, cc. Clothing in some places open mountain-sides, or scattered elsewhere here and there in the thickets of *Erica*, *Vaccinium*, &c.; crest or ridge in the Cayados Ravine beyond Camacha; forming extensive thickets on the mountains at the head of the Machico Valley, at the top of the Penha d'Agua and on all the mountain chains above P^to^ da Cruz; along the Levada dos Lamaceiros or da Rocha furada, and in Rib. Frio, da Metade and do Fayal; above Seixal, about the mouth of the Rib. Fundo and thence along the way to Rib. da Janella, &c. May, June.—A small tr. 10–20 ft. high, with normally a distinct trunk 3–6 or 8 in. in diam. (10–25 in. in circumf.) and a thick pyramidal bushy head like an Orange-tr., but

now usually reduced by lopping to a shr. 8–10 ft. high. Trunk as thick as the arm or leg, straight, erect, and with the branches evenly cylindric with a smooth cinereous or greyish bark blotched with large w. or pale cinereous patches. Foliage dense, dark blackish gr. and shining. L. subacute or more or less acuminate but not mucronate or pungently apiculate or spinose at the tip, 1–3½ in. long, ½–1¾ in. broad, moderately stiff and rigid but not thick, plain not undulate; the upper thicker or stiffer and always perfectly entire much like those of *I. Aquifolium* L., but sometimes those of the undergrowth or lower barren branches more or less irregularly spinuloso-serrulate and then rarely tipped also with a small weak flexible (not hard pungent) spinule; all dark gr. and shining above, paler or brighter gr. and without lustre beneath, the nerves and their submarginal loops on both sides quite inconspicuous and obsolete, more or less attenuate at the base into the petioles, which are 4 or 5 lines long or from ⅓ to ⅕ the length of the l. and grooved or channelled above. Inflorescence normally cymose, as in *Catha cassinoides* Hérit. Fl. small pure w. strong-scented like Privet (*Ligustrum vulgare* L.) or Black-thorn (*Prunus spinosa* L.), in shortly stalked terminal and axillary cymes shorter than the l. at or towards the ends of the terminal or last year's shoots; sometimes intermixed with or all rarely reduced to 1-fld. ped. Cymes erect or erecto-patent on short square or angular slender gr. stalks, 1–4 together from each axil, ½–1 in. long, fork-branched, leafless, with a minute bractlet at each division, 3 or 5–10 or 12-fld.; the whole with the pedicels and cal. quite smooth. Fl. 3 or 4 lines in diam., all but the central primary or axile one ultimately abortive i. e. marcescent and deciduous with their stalks and branches. Sep. and pet. 4, rarely 5, both blunt, rounded, the former wholly smooth (not ciliolulate) with sphacelate brown edges, the latter pure w. round concave. Anth. presently dark purplish coffee-brown, their fil. thick flat smooth pure w. Cal. 6-toothed smooth, in fr. persistent. Ov. ovato-globose mostly small short or depressed and scarcely rising out of the throat of cor. or base of stam. Berries dark shining vermilion or coral-red, ultimately almost black, globose or depressedly globose, 9 mill. in diam., each solitary (or very rarely binate) on an erectly ascending square or angular slender continuous ped. 6–9 lines long and mostly 1- or 2-scarred oppositely at or about the middle with the marks or remains of its former marcescent deciduous side-branches; remaining at the top of the preceding year's branches till the fl. appear at the top of the terminal last year's shoots. Flesh or pulp of berries y., soon turning at first olive-brown, then inky-black and viscous. Seeds 4 large hard and bony triangularly oblong, the back rounded and grooved down the middle, the 2 sides flat; pale yellowish, 3 lines long, 1½ broad at the back.

Little or no use is made of the w. somewhat hard and fine-grained wood except by cabinetmakers for inlaid work.

This must be the Mad. pl. intended by Webb under the name of *I. Aquifolium* which he says (Phyt. Can. ii. 137) he found with *I. Perado* in Rib. Frio. I cannot detect the least difference between the Mad. *Azevim* and *I. canariensis* Poir.—a pl. widely diffused in the Canaries and forming tr. 20–25 ft. high at La Esperanza above Laguna in Tenerife.

A careful study and consideration of the above synonymy will probably be found to justify the preference of Solander's original MS. name, though unentitled to precedence by priority of publication; his *I. Azevinho* having been by some accident omitted in the Hort. Kew., though, in his MSS., equally well distinguished and defined side by side with his *I. Perado* published in that work.

I. æstivalis Lam. seems to have had the l. or foliage of *I. Azevinho* with the fl. and inflorescence of *I. Perado*, and was possibly a hybrid. Willdenow (Sp. i. 708) has referred it, with ?, to *I. Perado* Ait.

I. balearica Desf. is very possibly a mere var. (=*I. Aquifolium* γ Lam. ?) of *I. Aquifolium* L.

I. maderensis Willd., being unaccompanied by any description, has no claim whatever for adoption; and indeed the name had been previously employed by Lamarck in a misspelled form (*maderiensis*) for *I. Perado* Ait.

I. canariensis Poir. is considered by Webb distinct from the Mad. *Azevim*; and though I cannot agree in this opinion, having been unable to detect any real difference between them, the adoption of the name would be objectionable even were this identity entirely established. The Can. pl. is widely diffused in the islands, particularly in Tenerife; where I especially observed it as a large shr. in one of Von Buch's localities for his *I. Perado* (not Ait.) Can. List p. 183, viz. at Agua Mansa above the Villa Orotava, and again forming a tr. 20–25 ft. high at La Esperanza above Laguna. In the Canaries the berries occasionally become even on the shr. quite black, as described by DC. l. c. In Mad. I have found this to be the case only when quite old or in dried spec.

2. I. Perado Ait. *Perado.*

Shr. sparingly and remotely branched, branches elongated weak and flaunting, horizontally spreading or declining, the upper more erect sometimes subumbellate; l. large and broad, distinctly nerved and veined, broadly oval or oblong-oval, always more than half and often nearly or quite as broad as long, mostly flat or but slightly undulate thick stiff and rigid, abruptly and shortly acuminate, always mucronate or tipped with a small hard pungent spinule and mostly more or less spinuloso-serrate at the edges, rarely quite entire; petioles very short; fl. like the fr. solitary on short 1- (very rarely 2–3-)fld. ped. aggregate in clusters on very short axillary spurs (abortive branchlets) towards or at the top of the last new shoots; ped. short, scarcely longer than the petioles or the diam. of the persistent fr.—Sol.! MSS. in BH.; Fydell's! MS. Mad. List no. 85; Ait.! Hort. Kew. (ed. 1) i. 169, (ed. 2) i. 278; Willd. Sp. Pl. i. 708; Pers. i. 151; Buch! Mad. List 198. no. 421; DC. ii. 14. no. 3; Spr. i. 495; WB. ii. 137; Seub. Fl. Az. 46; Wats. in Godm. Az. 146. *I. maderiensis* (sic) Lam. Dict. iii. 146 (not sec. Link, *I. maderensis* Willd. Enum. Suppl. 8); Duham. Tr. des Arbr. (ed. nov. 1801–1816) i. p. 7. t. 2. *I. crassifolia* Meerb. Ic. pict. t. 4. *I. platyphylla* WB.! ii. 135, t. 68 (forma arborea); Bot. Mag. t. 4079 (inflorescentia nimis luxuriante submonstrosa). *Aquifolium amplissimis foliis ex Insulis Fortunatis* Pluk. Alm. 38. t. 262. f. 1.—Shr. per. Mad. reg. 3, $\frac{c}{2}$. Here and there, occasionally but not commonly, in thickets of *Erica*, *Vaccinium*, &c., chiefly in ravines with *I. Azevinho*, but much less frequent and not forming thickets by itself. Rib. da Metade along the Levada, Boa Ventura, Serra do Seixal, Levada dos Lamaceiros or da Rocha furada above P^to^ da Cruz; not seen below 3000 ft. Apr., May.—Always in Mad. a mere straggling shr. 3–6 or 8 ft. high branched from the base, the branches loose remote and flaunting, mostly gr.-barked till 2 or 3 years old. L. 2–3½ in. long, 1½–2 broad, often distichous or all in one plane, of a lighter or brighter gr. and mostly thicker stiffer substance than *I. Azevinho*, with the veins more distinct and with a strong pellucid nerve forming the edge or border and produced at regular or irregular intervals into fine short pellucid spinules pointing forwards in the plane of the leaf itself, rarely perfectly entire or without at least 1 or 2 spinules and never without one at the tip. A little within the margin each primary nerve bends arcuately upwards and joins the next above it, forming a series of outwardly convex loops or scallops and enclosing about 8 oblong spaces on each side the midrib between the 8 or 9 primary nerves. The lower or smaller l. on the branches are sometimes almost or quite orbicular or rounded; all are mostly very thick and rigid but only slightly undulate, shining above, paler and

merely glossy beneath, somewhat abruptly acute at the tip and slightly rounded or at least not at all attenuate at their base into the very short stout petioles which are only 2 or 3 lines long, dark purplish and channelled above. Inflorescence abortively cymose as in *Catha Dryandri* Lowe. Fl. pinkish w., purplish in the bud, mostly larger than in *I. Azevinho*, in close compact axillary clusters towards the ends of the young branches on short woody knobs or spurs, each solitary on its own 1-fld. ped. which is about 3 lines long, smooth and round, with a pair of minute brown ovate bractlets at its base; lobes of cal. very obtuse rounded obscurely and minutely ciliolulate. Pet. elliptic concave pure w. inside, purplish outside towards their tips. Anthers small; fil. w. about half the length of pet. or a little more. Ov. very large prominent exactly the height of the fil., globose bright gr. smooth shining, crowned with the large flattened depresso-globose subumbilicated sessile light-yellowish gr. stigma. Berries shining bright light coral-red, crowned with the black scarlike remains of the stigma, slightly depressedly globose, 9 mill. in diam. But few arrive at maturity comparatively with the quantity of fl. Their ped. are only $1\frac{1}{2}$–3 lines long, equal cylindric.

Looking simply at the inflorescence, *I. Perado* might seem to be a mere form of *I. Azevinho*, in which the greater development of the l. had checked the full evolution of the 1-fld. ped. into cymes. But other differences remain not thus to be accounted for, and indicative on the whole of aboriginal distinction.

Though the country people in Mad., from relying too exclusively on the "spinose and not spinose" or entire l. occasionally apply the name "Perado" to mere states of the "Azevim," yet are they generally fully cognizant of their absolute distinctness, and indeed rarely make the mistake just mentioned.

In the Canaries, especially at Agua Garcia in Tenerife, *I. platyphylla* Webb is quite arborescent. But this is the only difference I can discover between it and the Mad. pl.

In *I. platyphylla* BM. t. 4079 the inflorescence is evidently not truly cymose, though so described, i. e. not in distinctly stalked few-fld. regularly fork-branched cymes, but in aggregately clustered 1–3-fld. ped. crowded on axillary leafy spurs or branchlets, just as occurs in luxuriantly flowering states of *Catha Dryandri* Lowe as contrasted with *C. cassinoides* Hérit. Indeed in inflorescence these two last-named pl. present re-

spectively an exact analogy with *I. Perado* and *I. Azevinho*, though the correspondence is just reversed with respect to foliage.

Order LIV. SAPOTACEÆ.

The Star-apple or Sapodilla Family.

Fl. perfect regular. Cal. free persistent mostly 5- rarely 4–12-partite, the lobes imbricate or valvate, adpressed in fr. Cor. deciduous hypogynous, gamopetalous, the lobes as many or 2–3 times as many as and alternate with those of cal., imbricate in bud. Stam. definite distinct, mostly of 2 sorts, barren and fertile; the barren petaloidal, the fertile or antheriferous mostly as many as and alternate with them and adnate to the base of the cor.-lobes. Anth. mostly extrorsal. Style 1 simple. Stigma minutely lobed. Ov. free mostly hispid 2–5–12-locular, cells 1-ovulate. Ovule single anatropal pendulous from the top or ascending from the base of the axile angle of its cell, in fr. adherent to the same. Fr. a pome or by abortion a drupe, the cells mostly becoming all but one or two abortive. Seeds crustaceous or hard and bony shining, hilum inferior or lateral sometimes scarlike very large and elongate; embryo large orthotropal; alb. either none with a large oily embryo, or fleshy and oily. Cotyled. large leafy or fleshy and oily, contrary to the hilum except in *Argania* R. Br. Radicle inferior. Tr. and shr. with milky juices, mostly soft wood and often esculent fr., chiefly tropical; the only exception being the Madeiran pl. here recorded. Another sp. of the Family (*Sapota marginata* Dcne.) is also peculiar to the Cape Verdes; but none occurs in the intermediate Canaries! L. mostly coriaceous and alternate, penninerved entire shortly petioled exstipulate, mostly silky beneath. Fl. axillary small aggregate or solitary.

1. SIDEROXYLON. Cal. and cor. 5-partite or 5-fid. Stam. inserted on the very short cor.-tube in 2 rows; 5 sterile petaloid, alternate with the pet. and like an inner cor.; 5 fertile alternate with the sterile and opposite the true pet.; anth. extrorsal shorter than their fil. and affixed to them by their middle, not erect or adnate. Ov. 5-(rarely 4–2-)celled, the cells 1-ovulate; ovules all but 1 or 2 or 3 abortive. Fr. an ovoidal or globose 1–3-seeded drupe or berrylike pome. Seed ovoidal or globose bony shining obtusely 5-ribbed; with a small round hilum, copious albumen and large flat leafy cotyledons. — Evergreen unarmed tr. or shr. with hard wood, coriaceous reticulately veined l., small aggregate w. pink or flesh-col. fl. and small red or blackish rarely y. fr.

1. Sideroxylon L.

1. S. Marmulano Lowe. **Marmulano.**

Shr. unarmed; young shoots and petioles more or less pale rusty-pubescent; l. always quite smooth and shining coriaceous reticulate subspathulately obovate-oblong and acute or obtusely or retusely obovate or spathulate, very entire, pellucidly marginate; pedic. 2–5- or 6-aggregate in axillary fascicles short unequal never more than twice the length of the cal. or half that of the petioles, both pedic. and cal. closely and adpressedly rusty-pubescent or velvety; sep. broadly ovate subobtuse, the inner with coloured margins; cor. pale rose-pink or flesh-col. campanulate with a very short tube; pet. twice the length of sep. erecto-patent, ovate; barren or antherless stam. ovato-lanceolate concave resembling an inner cor. or *corona*; fr. obovate or obovoidal, at first red, then black.—Lowe Prim. 22 and App. iii.; DC. viii. 181. *S. Mirmulans* (sic) Buch! 193. no. 205.—Shr. per. Mad. reg. 1 chiefly, 2 occasionally, c; PS. reg. 1, rrr. Sea-cliffs to the East of Funchal, at S. Vicente above the Cemetery and near the sea, between Seixal and Rib. de João Delgada, at Rib. da Janella, about the Entrosa, at S^ta Anna, and in 1829 on the small rocky islet off P^to da Cruz; also 1500–2500 ft. up the Rib. de S. Jorge, &c. P^to S^to, June 1832; "Serra de Dentro," S^r Moniz, Dec. 1856. Fl. Dec., Jan.; fr. July, Aug.—A low thickly bushy and leafy shr. mostly about 3 or 4, rarely above 7 or 8 ft. high, with bright full gr. shining handsome foliage and subproliferously branched, the branches stiff and thickish round erect with a rough greyish brown bark sprinkled with numerous brown Hysteriform lenticels; the younger or last year's shoots, on which the fl. are produced, gr., with often somewhat of a glaucous hue and more or less pubescent with fine short close-pressed whitish or pale rusty hairs. L. alternate 3–5 or 6 in. long, 1¾–2¼ broad, spathulately obovate or oblongo-obovate acute or very obtuse, smooth altogether from the first, light fresh gr. and flaccid thin and delicate whilst young, coriaceous stiff and rigid afterwards and darkish full gr. above with pale midrib, paler beneath, shining on both sides but most brilliantly above whilst young, finely and elegantly pellucido-reticulate and with a distinct pale pellucid sharp thin border continued a little down the petioles; the midrib prominent and pale y., or reddish downwards, the lateral nerves equidistant faint and inconspicuous. Both l. and st. whilst young give out a thick viscid bitter milky juice when cut or bruised. Petioles ¼–1 in. long, mostly about ½ in., pubescent above and all round at their axils, presently glabrescent, pale y. like the midrib of the l., but often red or purplish brown whilst young. Fl. small inconspicuous, in crowded

axillary clusters on the newest shoots; ped. 1-fld., 2 or 3 lines long, round or a little compressed. Cal. deeply 5-fid persistent. Cor. rotato-campanulate, pet. concave, their edges erosulate or subtomentoso-ciliolulate, very pale pink or flesh-col., deeper in the throat; barren stam. petaloidal erosulate alternate with and as long as the pet. Fertile stam. alternate with the barren or opposite the pet., exserted, longer than the pet.; anth. oblong 2-celled rose-red beneath at the insertion of the fil.; pollen pale or whitish. Style single thickish cylindric shorter than the pet.; stigma merely the smooth abrupt or obtuse tip of the style. Ov. ovate rusty-pubescent 5-celled; ovules one in each cell, oval, 4 mostly abortive. Fr. a shortly stalked or nearly sessile drupe (abortive pome) about the size and col. of a Sloe (*Prunus spinosa* L.) i. e. $\frac{3}{4}$ in. long and $\frac{1}{2}$ in. broad, shining deep black without bloom shortly obpyriform or obovately globoso-ovoidal; the flesh one line thick, firm, bright sap-green, rather copiously milky, the milk thin viscous whitish; taste sweetish but somewhat salt or mawkish and disagreeable, like that of the fr. of *Chrysophyllum oliviforme* Lam. or rather the seeds of *Staphylæa pinnata* L. Seed almost always single large irregularly or obliquely ovato-globose, apiculate, about $\frac{1}{2}$ in. long, 4 or 5 lines broad, smooth shining light brown, divided into 5 unequal raised compartments like a melon. *Hilum* oblique small.

The fr., having a little sweetness, is occasionally eaten by the country people, notwithstanding its dryness and somewhat saline unpleasant flavour.

This pl. is strictly peculiar to the Mad. group, and is not found in either the Açores, the Canaries or Cape Verdes. In the Açores it is represented by *Myrsine africana* L., *β. retusa* Alph. DC.; the "Marmolan" of the Canaries is *Myrsine* (or *Pleiomeris* DC.) *canariensis* Willd.; and the "*Marmulano*" of the Cape Verdes ("*Sideroxylon Marmulana*? (Madeira)" of Chr. Smith's St. Iago List in Tuckey's Narrative 249) is *Sapota marginata* Dcne. (Webb Spic. Gorg. 169. t. 13), found by me not only in St. Iago but in S^{t} Antão, Fogo and Brava. Chr. Smith's original Cape Verde spec. without fl. or fr., marked by himself "*Sideroxylon* MSS. no. 41," is still extant in BH.

Order LV. OLEACEÆ.

The Olive Family.

Fl. perfect regular, rarely imperfect apetalous. Cal. gamosepalous 4-lobed or 4-toothed free persistent. Cor. deciduous

hypogynous more or less gamopetalous, lobes or pet. 4, united either all together or in pairs, rarely free or 0, valvate in bud. Stam. 2 (rarely 4) opposite each other, adnate to and alternate with the pet.; anth. introrsal. Style single short or 0, stigma bifid or entire. Ov. free 2-celled, cells alternate with the stam. or opposite the pet., each 2-ovulate; ovul. pendulous. Fr. drupaceous, baccate, capsular or samaroidal, 2-celled and 2–4-seeded, or often by abortion 1-celled 1-seeded. Seeds inverted pendulous; embryo straight axile, half the length of the seed, mostly enclosed in copious thick fleshy or horny albumen; cot. leafy; radicle superior.—Tr. or shr. with opposite branches often compressed upwards and with a terminal bud. L. without stip. opposite simple or rarely (as in *Fraxinus*) odd-pinnate. Fl. small in terminal or axillary trichotomous panicles or rac., w. or lilac often fragrant, pedic. opposite 1-bracteate.

Tribe I. *OLEINEÆ.*

The Olive Tribe.

Fr. fleshy drupaceous and 1–2-seeded, or baccate and 2–4-seeded. Alb. copious.—L. simple mostly coriaceous and entire. Wood close or fine-grained, hard and durable.

1. OLEA. Cal. small 4-toothed. Cor.-tube short, limb 4-partite. Stam. 2 inserted on base of cor.-tube, exserted. Style short; stigma large conico-capitate notched or bifid. Flesh of drupe oily; stone (*putamen* or *pyrena*) hard bony mostly 1- rarely 2-celled and 2-seeded.—L. naked or scaly i. e. lepidoto-punctate.

2. NOTELÆA. Like *Olea*, but pet. 2 distinct and each bipartite (i. e. 4 united by twos into 2 distinct opposite pairs) with stam. inserted at their base or claw, and stigma sessile; style 0.—L. naked, often simply punctate, not scaly.

Phillyrea. Like *Olea*, but cor. rotate equably 4-partite almost tubeless, anth. subsessile not exserted, flesh of small berry-like drupe not oily, *putamen* thin fragile papery or parchment-like and l. always naked, simply punctate, not scaly.

Tribe I. *Oleineæ.*

1. OLEA L.

1. O. EUROPÆA L. **The Olive.** *Azeitona, Oliveira.*

Arb. or shr. branches subverruculate; l. nerveless or veinless especially beneath, lanceolate, oblong, oval or ovate entire, minutely lepidote or scaly, glabrescent shining and puncticulate

above, furfuraceous and mostly silvery-grey or hoary beneath; fl. in erect axillary mostly simple few-fld. or compound many-fld. brachiately divaricate panicled rac. or racemose panicles; fr. ellipsoidal, ovoidal or globose, drooping.—Linn. Sp. 11; Vill. Dauph. ii. 5; Lam. Dict. iv. 537; ejusd. Ill. t. 8. f. 1; Desf. i. 9; Brot. i. 10; Pers. i. 8; Ait. Hort. Kew. i. 21; Spr. i. 34; Risso Hist. Nat. ii. 6 with a good fig.; WB. iii. 161; Koch 553; DC. viii. 284; Gren. et Godr. ii. 474; Willk. et Lange ii. 672.

β. *maderensis* Lowe; shr. somewhat loosely branched, branches subelongate slender; l. nerveless or veinless especially beneath, linear-lanceolate acuminato-cuspidate much attenuate downwards into the distinct moderately long petioles, glossy dull greyish gr. above, paler but not silvery w. beneath, the margins slightly reflexed or revolute; panicles ebracteate distinctly stalked solitary axillary or both axillary and terminal, erect, once or twice compound somewhat loosely or remotely many-fld., about half the length of the l., pyramidal brachiately and divaricately branched, branches opposite horizontally patent or deflexed, racemosely 3–5- or more-fld., rarely again branched or twice compound; fr. rather small subglobosoovoidal shining purplish black scarcely fleshy.—Lowe Novit. (1838) p. 15 or 537. *O. europæa* β. *cerasiformis* WB. (1840) iii. 162. *O. europæa*, "Sp. valde simile *Oleæ glabellæ*" (scil. Herb. Banks. = *O. exasperata* Jacq.), "Fructus parvi subrotundi stylo persistente coronati" Buch! Mad. List 192. no. 168. "*O. divaricata* Banks. MS. Smith's Herb." Lemann in litt. *Elæagnus angustifolia* Sol! in BH. quoad ex. Mad. (not Linn.). —Shr. per. Mad. reg. 1, c. Sea-cliffs here and there all along the S. coast of Mad., more rarely in the N. A little out of Funchal to the eastward along the Caniço road on the sea-cliffs and sides of ravines, S. Gonçallo; on the E. face of the Brazen Head; at Camera de Lobos close above the bridge beyond the town ascending out of the ravine, on the right of the road; at the top of Cabo Girão on the face of the cliff towards its further or W. end; on the Ilheo do Porto da Cruz, &c. Fl. and fr. May, June.—A low somewhat loosely branched shr., 2 or 3 to 6 or 8 ft. high, with pale dull grey or hoary (not silvery) foliage. Branches slender straight virgate grey or whitish, smooth but sprinkled with little tumid wartlike lenticels, quadrangular while young. L. with petioles $1\frac{1}{2}$–3 in. long, 3 lines wide, stiffish but not rigid, sharply cuspidate and almost pungent at the tips, punctate glabrescent and shining above, closely scaly or punctato-lepidote and duller but not much paler or greyer beneath; their petioles 2–3 lines long. Panicles stalked axillary rarely also terminal, 1–2 in. long, $\frac{1}{2}$–$\frac{3}{4}$ broad at the base, their stalks $\frac{1}{4}$–$\frac{1}{2}$ in. long, rarely more than once compound, the

branches subremote or distinct, regularly opposite on alternate sides of the rachis and like the short pedic. widely divaricate, mostly 5-fld.; br. and bractlets obsolete or 0. Fl. scentless small w., in bud obovoidal yellowish; lobes of cor. equal ovate pure w. Anthers large, deep or., exserted, with distinct fil. Stigma nearly as large as the ov. on a distinct style, notched at top, bilobed at the base. Fr. 5 or 6 lines long, 3–5 broad erect on its pedic. and in erect or erecto-patent pan. of 2–5 or 6 together, at first in ripening bright purplish red, then black and altogether much resembling the fr. of the Portugal Laurel (*Prunus lusitanica* L.), shining, without bloom and apparently quite smooth and even, but through the lens faintly shagreened; the skin and flesh very thin and dry, bitter without any oily flavour; the stone ovoidal very large.

The panicles are smaller and much more widely divaricate in all their parts, but otherwise precisely of the form and on the plan of that of *Ligustrum lucidum* Ait. (BM. t. 2565).

The bitter dry and thinly fleshy fr. (*Azeitona*) seems to be entirely neglected. Indeed it is unfrequently produced at all, and in every case would yield a very poor return in oil.

In drying, the Camera de Lobos and Cabo Girão spec. gave out a quantity of a loose mealy or granular sweet powdery substance, of a pale y. col., somewhat shining and almost exactly resembling fine light-col. raw-sugar. This is certainly an exudation from the pl. itself (the l. chiefly), and no product of an *Æcidium*, as suggested by Webb l. c. It is evidently of the nature of the drug commonly called Manna in our shops.

I cannot perceive, either in dried spec. or in the characters assigned by DC. to the Cape *Olea verrucosa* Link, any thing except the smaller fr. (not bigger than a pea or 2–3 lines by 2 lines in diam.) to distinguish it from the present Mad. and Can. pl., which is certainly a mere var. of the common European Olive (*O. europæa* L.).

In Fogo, one of the southernmost Cape Verdes, as also in the more northernly islands of S. Antão and S. Nicolão, I procured spec. of an Olive resembling perfectly in foliage the present pl., but without fl. or fr.

γ. *buxifolia* Ait.; shr. thickly and closely branched or bushy, branches short stiff crowded; l. hard and rigid rather small shortly oblong, oval, obovate or rounded, mostly obtuse and abruptly apiculate or mucronulate, very dark gr. shining and glabrescent above, paler and more or less scaly or furfuraceous

yet not w. or hoary beneath, the margins slightly revolute.—*O. europæa* ζ. *buxifolia* Ait. l. c.; Risso var. 1, l. c. 7; β, Lam. l. c. 538 (l'olivier sauvage); ejusd. Ill. 28. no. 73; *a. Oleaster* DC. l. c. partly.—Shr. per. Mad. reg. 1; ND.; rrr.

Subv. 1; l. decussate short rounded or broadly oval mucronulate nearly or quite sessile; branches straight regularly opposite and decussate, stiffly divaricate or erecto-patent, sometimes spinescent; fl. and fr. as in β.—N. or Flat Deserta, in the centre of the island, 15–20 pl. which have been burned or stubbed down to their stocks or stumps which are sometimes 2 or 3 ft. in circumf. They are apparently the relics of former cultivation, growing at regular intervals in a central spot of about 2 acres, inclosed by traces of a wall and near the ruins of a house or cottage.—A small low bush. Branches very hard stiff straight and rigid, squarish towards the ends and often subspinescent, pale ash or whitish. L. small 3 or 4–6 or 7 lines long, 2 or 3–5 broad, mostly round or broadly oval, obtuse or retuse and mucronulate, but sometimes on young vigorous shoots lanceolate-oblong and acute, very hard stiff and rigid, dark gr. shining and nearly naked or with only a few scattered scales above, but pretty closely lepidote or furfuraceous beneath; in one or two cases beautifully variegated with y. In June 1855 I found several of these pl. in fl., with plenty of old fr. or their stones beneath them on the ground.

Subv. 2; l. irregularly crowded, oblong or obovate-oblong petiolulate not mucronulate; branches thickly and irregularly crowded abbreviate.—S. Gonçallo below the Chapel of N. S. das Neves on rocks inland but towards the sea.—A little scrubby peculiarly dark densely branched shr. with short stiff crowded rigid thickly leafy branches coated with a black soot-like *Fuligo*. Petioles short but distinct, ½–1 line long. L. rigid very dark blackish gr., paler but not at all hoary and inconspicuously yet pretty closely furfuraceous or lepidote beneath, shining and punctate but nearly or quite smooth or naked above, 6–12 lines long, 3–4 broad, obtuse or retuse, not mucronulate, rarely subacute. Fl. and fr. not seen.

2. Notelæa Vent.

1. N. excelsa (Ait.). *Pão branco.*

Arb.; branches proliferously umbellate, the younger compressed decussately or alternately in opposite directions between each pair of l., smooth, sparingly verruculate; l. petiolate stiff coriaceous oblong-lanceolate or elliptic acute at each end, altogether smooth and naked, entire finely reticulato-granulate and obscurely and remotely punctate; fl. in axillary and sometimes terminal binate or solitary rac. which are at first drooping, then

in fr. erect; bracts large conspicuous minutely furry-pubescent at the edges, the lowest pair connate subpersistent membranaceo-coriaceous, the upper membranous and quickly falling; ovary ovate-oblong, stigma capitate entire oppositely bilobed at the base; fr. erect large oblong-ovoidal or elliptic.—WB. iii. 163. t. 186. *Picconia excelsa* DC.! viii. 288; Seub. Fl. Az. 35. *Olea excelsa* Ait.! Hort. Kew. (ed. 1) i. 14, (ed. 2) i. 22; Pers. i. 9; Poir. Suppl. iv. 139; Buch! 192. no. 169; Spr. i. 34.—Tr. per. Mad. reg. 3, rr. Wooded ravines and thickets here and there a solitary tr. or two; Rib. da Metade, Serra do Porto da Cruz, Rib. do Gato at the head of the Curral das Freiras, Rib. da Boa Ventura, Serra d'Agua, Rib. das Fontes at Seixal, &c.; also planted in gardens at the Mount, Camacha, &c. Fl. Febr.–July; fr. Aug., Sept.—A lofty tr. 40–60 ft. high, with a branchy not spreading nor yet bushy head and whitish or pale ash-coloured smooth or even bark; wholly smooth except the fl.-bracts. Terminal branches umbellate thickish and alternately compressed beneath each pair of l. much as in the common Ash (*Fraxinus excelsior* L.) solid or almost without pith but very brittle, rounded downwards and roughened with tumid Hysteriform lenticels. Leaf- and fl.-buds large (especially the latter) with valvate caducous scales or bracts. L. regularly decussate, $2\frac{1}{2}$–3 in. long, $\frac{3}{4}$–1 in. broad, very hard and rigid, cymbiform, somewhat shining and dark gr. above, paler and duller beneath, the side-nerves parallel and little branched, without furfuraceous scales but with a few indistinct remote pores. Petioles 4–9 lines long, channelled above, very convex beneath. Fl. pure w. falling without turning brown, larger than in *Olea europæa* L. and sometimes very fragrant somewhat as in *Osmanthus fragrans* Lour. They grow in loose slightly drooping short axillary or axillary and terminal 6–12-fld. rac., 1–2 in. long, much shorter than the l., and produced mostly singly but sometimes in pairs from each axil towards the ends of the branches, and in the latter case one above the other, the uppermost thus becoming superaxillary; rachis and pedic. quadrangular smooth. Pedic. 2 or 3 lines long decussately opposite. Br. concavely ovate or ovate-lanceolate smooth but a little fringed or cottony at the edges, pale yellowish gr. at first, then turning brown, the upper presently falling, the lowest pair or two more persistent large rigid brown and subtubularly connate. Sep. 4 distinct small ovate obtuse, sometimes minutely fringed or cottony at the edges, persistent brown and withered in fr. Pet. 2 distinct very deeply bilobed almost to the base, lobes long ligulate and undulate, mostly irregularly notched or bifid with incurved or recurved tips. Stam. 2 attached to the base or claw of the 2 opposite pet. about half their length and falling with them; fil. very short broad flattened; anth. large adnate narrow-oblong or lanceolate acute 2–4 times the length of their

fil., 2-celled, bursting laterally; pollen bright y. Ov. large smooth gr. fleshy subangular ovate-oblong, elliptic or subelongato-conic, narrowing upwards and crowned by the large capitate yellowish perfectly sessile deflexedly 2-lobed stigma. Ovules geminate in each cell, oblong or elliptic. Fr. an erect drupe, at first red then dark v.-blue with a fine blue bloom resembling a small damson-plum, elliptic-oval, 9–10 lines long, 4–5 lines broad, fleshy or even pulpy but not juicy or in the least oily, sweet but intensely bitter with a slight astringency, not wholly unpleasant, yet not eaten. Flesh scarcely one line thick dark-coloured, reddish towards the stone; the latter large elliptic acute at each end, hard and bony, with 2 opposite prominent (sutural) ribs and 3 intermediate (8 in all) anastomosing by transverse branchlets towards the top, and complicated at the base by other short longitudinal ribs reaching only partly up the intermediate spaces of the 8 stronger ribs, 1-celled by abortion of the 2nd cell. Shell between crustaceous and bony, not very hard, about 1 mill. thick, smooth and satiny inside. Seed single large ellipsoidal sharp-pointed at each end, $\frac{1}{2}$ in. long, half as broad, not compressed, smooth and brown like an almond, nearly tasteless but very slightly bitter, composed wholly of the somewhat horny, not brittle or fleshy albumen, curiously impresso-venulose longitudinally, attached by the *hilum* a little above the middle to the rather long membranously winged or dilated pseudo-arillate *funiculus* which rises vertically from the base of the cell, being thus truly, though laterally, pendulous. Wings of aril curiously striolate closely and parallelly, and cleft or toothed at the edges. Embryo straight, longitudinally axile in a large roomy central hollow, very large, distinct, whiter than the albumen or rest of the kernel.

The wood of this tr. is extremely heavy, hard and solid. A cube of it barely floats in water with the upper side level with the surface. It is highly valued for purposes in which strength and toughness, combined with hardness, are required; such as especially the keels of large and heavy boats, liable to constant shocks and grinding on a rocky or shingly beach. Hence the yearly increasing scarceness of the tr., which indeed seems likely soon to become extinct altogether, though it can be raised most readily from seed.

Phillyrea Lowei DC. viii. 293 (*Olea microcarpa* Lowe MSS. olim, not Vahl) was founded on spec. from 2 or 3 bushes in the shrubberies of the late J. D. W. Gordon Esq. at the Mount, 1900 ft. above the sea, and alleged by his Portuguese gar-

dener, by whom they were called "Oliveira," to have been brought thither from "near the sea to the E. of Funchal." Thus I was led originally to suppose them to be mere depauperated forms with imperfectly developed fr. of the common native Mad. Olive, *O. europæa* L. var. β, supra. They belong unquestionably, however, as referred by the late Chev. de Candolle to PHILLYREA; and as no such pl. has ever been found "to the E. of Funchal" or elsewhere in Mad. wild by myself or any other botanist, and as the similarity of these Mount garden pl. to *O. europæa* β, supra, growing plentifully on the sea-cliffs to the E. of Funchal, is quite sufficient to account for the wrong Portuguese name and origin ascribed to them by the gardener, it may be almost certainly concluded that they have no legitimate claim to a place in the Mad. Flora, but were introduced with sundry other pl. and shr. in the same grounds from either Portugal or England, and are thus most probably merely a slightly aberrant form of *P. angustifolia* L. I will append however my original description from the living pl.

"In Mr. Webster Gordon's garden at the Mount, Apr. 23rd 1831. Several low thick bushes in full fl. Branches stiffer than in the ordinary state of *O. europæa* L. wild in Mad. L. very dark gr. above, rather paler or brighter beneath but not in the least silvery-grey or hoary! distinctly 3-nerved on both sides and veined or reticulate above, the edges usually entire, but occasionally with here and there a minute tooth or even sometimes regularly minutely toothed, narrow-lanceolate, very acute, distinctly petiolate, about 2 in. long and ½ in. broad, hard coriaceous and remarkably stiff and rigid." (In a dried ex. now before me, they are sprinkled with a few remote large pores beneath, but are perfectly naked or without any silvery or branny scutate or umbilicato-peltate scales, being also excessively minutely, finely and closely shagreened or papillosopustulate on both sides.) "Fl. in very short close erect densely crowded many-fld. sessile axillary forked coarctate or congested tufts or cymes, usually 2 from each axil, 3 or 4 lines long or broad and not above ⅓ or ¼ the length of the l., slightly fragrant like Primroses, but less pleasantly. Branches of cymes and pedic. minutely furry-puberulous, sep. smoother or only minutely ciliate. Cor. distinctly 1-petalous, 4-fid, the lobes equal rounded pale yellowish gr. Anth. large. Stigma large emarginate at top, 2-lobed at base exactly as in *Olea excelsa* Ait. Ov. 2-celled, each cell 2-seeded.—Drupes (Oct. 8th 1831) now ripe, produced sparingly and singly here and there amidst a profusion of clustered abortive withered or dried up fl. and pedic., very small, 2–5 mill. in diam., nearly spherical i. e. depresso-globose, apiculate by the short dried-up remains of the style, soft smooth or even, but through a lens finely granulated as if close-shaven, like shagreen, of a dark dull v.-blue like a plum and appearing pruinose or covered with a bloom but which does not rub off."—I have unfortunately

no note concerning the nature of the stone or *putamen* in the fresh pl.; but though my original reference of it to *Olea* would imply its being hard and bony, it is distinctly described by DC. from my spec. to be chartaceous as in *Phillyrea*. And so accordingly I find it in an old dried spec. to be stiff and firm but fragile thin and certainly papyraceo-crustaceous or pergamentaceous, not hard thick and bony as in *Olea*.

The more regularly or distinctly 3-nerved l. seems to me the only point in which the above pl. (which is most certainly *P. Lowei* DC.) differs from *P. angustifolia* L.

Order LVI. JASMINACEÆ.

The Jasmine Family.

Fl. perfect regular. Cal. gamosepalous 5–8-fid or toothed free persistent. Cor. hypogynous gamopetalous hypocrateriform 5–8-lobed, lobes in bud imbricate and twisted, rarely valvate. Stam. 2 inserted on and included in the cor.-tube. Anth. 2-celled erect introrsal. Style short simple; stigma capitate 2-lobed. Ov. free without hypog. disk, 2-celled, 2-lobed at top; ovul. at first lateral, then ascending or erect, 1–2 (rarely 3–4) in each cell. Fr. a didymous i. e. deeply bilobed or bipartite berry or caps. Seeds erect with little or no albumen when ripe; spermoderm often thickened; embryo straight; radicle inferior; cot. fleshy flattened.—Erect or sarmentose and climbing shr. L. without stip. opposite or alternate simple or mostly odd-pinnate, lfts. 3–5 or 7. Fl. trichotomously paniculato-cymose w. or y., mostly fragrant. Pedic. opposite 1-bracteate.

1. JASMINUM. Cal. campanulate 5–8-lobed, lobes short and tooth-like or subulate. Cor. salver-shaped, the tube slender, limb flat 5–8-lobed, lobes oblique twisted in bud. Fr. a didymous berry, lobes divaricate, each mostly 1- (rarely 2-)seeded. Seeds erect nearly or quite exalbuminous.—Shr. mostly climbing. L. compound and odd-pinnate or 1-foliolate by abortion of side-lfts. Fl. cymose w. or y. fragrant.

1. JASMINUM L.

§ 1. *Trifoliolata* DC.; l. opposite 1–3–5-foliolate; cal.-teeth short; fl. w.

1. J. AZORICUM L. *Jasmin branco.*

Sarmentose or climbing, smooth; branches weak or flexible round elongate diffuse or trailing; l. 3-foliolate, lfts. rather large undulate smooth shining subcoriaceous ovate or subcordate-ovate acute or subacuminate; cymes axillary and terminal form-

ing a leafy oblong panicle: pedic. short longer than the cal.; cal. campanulate 5-toothed, the teeth short ovate acute; tube of cor. scarcely longer than the lobes; "berries obovato-globose."—Linn. Sp. 9; Lam. Dict. iii. 218; Pers. i. 8; Ait. Hort. Kew. (ed. 2) i. 17; Bot. Reg. t. 89; BM. t. 1889; Buch 192. no. 166; Spr. i. 32; DC. viii. 311; Seub. Fl. Az. 35. *J. azoricum trifoliatum, flore albo odoratissimo* Commel. Hort. med. Amstel. i. 159. fig. 82.—Shr. per. Mad. reg. 3, rrr. Clefts of overhanging rocks or cliffs in remote deep glens of the interior, about 3000 ft. above the sea. "In the Cerejeiras ravine, descending from the Caminho Central into the Rib. Brava, in a deep glen to the right of the path, 3 or 4 pl. hanging down a perpendicular cliff or at its base, undoubtedly wild, Oct. 10th 1866," Capt. Norman R.N.; having been first discovered in the spot a year or two before by a Portuguese countryman employed to collect pl. Previously it had occurred to myself, Lemann, and other botanists or collectors only in gardens occasionally at Funchal and the Mount. June–Oct.—St. climbing, rampant or decumbent; branches slender straight long virgate or rather osier-like flaunting or declining; either trailing or hanging loosely over walls or down rocks or rocky banks, not self-supporting, ash-coloured below, gr. upwards and always in Mad. smooth. Foliage large and somewhat dense or cumbrous, bright shining dark gr. Petioles $\frac{1}{2}$–1 in. long, petiolules $\frac{1}{4}$–$\frac{1}{2}$ in. long, all round slender smooth not twining, the middle petiolule longest. Lfts. 3- (rarely 4-)nate, $1\frac{1}{2}$–3 in. long, about half as wide, thin but somewhat stiff or coriaceous and evergreen, mostly considerably waved or undulate. Fl. pure w. deliciously fragrant in loose leafy terminal panicles, rather larger than in *J. officinale* L., with the lobes broader and less acuminate and the tube thicker and shorter (i. e. about 4 or rarely 6 lines long). Cal. (including its teeth) 1–$1\frac{1}{2}$ line long. The immature fr. is described by Commelyn as "oblongo-rotundus et viridis. Lauri baccis magnitudine non cedens." The ripe fr. is figured in the Bot. Reg. globose, black, size of a small cherry.

The objection against the old-established and familiar name of this species does not seem so absolute or surely grounded as to warrant any change. For though the pl. has not been found in the Açores by any botanist or collector of the present century, it cannot positively be affirmed not to have existed in them formerly, at least in gardens, in the time of Commelyn, who says positively, "Soboles est insularum Azores dictarum, indeque advectam primus possedi,"—especially considering that even in the well explored island of Mad. (to which it had

been long ago assigned as a native by Solander) it escaped as a wild pl., though diligently searched for, the observation of myself and every other recent botanist or collector till 5 years ago.

§ 2. *Alternifolia* DC.; l. alternate 1–3–5–7-foliolate; fl. y.

2. J. ODORATISSIMUM L. *Jasmin Amarello.*

Erect, smooth; branches stout stiff straight and woody rounded or faintly angular; l. 3-foliolate rarely 1- or 5-foliolate, lfts. broadly oval ovate-oblong or lanceolate-oblong, coriaceous stiff shining, acute or subobtuse; cymes axillary and terminal few-fld. shorter than the l.; pedic. short longer than the cal.; cal. campanulate 5-toothed, the teeth short ovate subobtuse; cor.-tube longer than the broad obtuse lobes; berry 2-lobed, lobes distinct large oval horizontally patent or divaricate subpellucid, each 2-seeded.—Linn. Sp. 10; Lam. Dict. iii. 219: BM. t. 285; Pers. i. 8; Hort. Kew. (ed. 2) i. 18; Buch 192. no. 167; Spr. i. 32; DC. viii. 312. *J. Barrelieri* WB. iii. 165? *J. flavum odoratum* v. *Gelseminum trifolium odoratissimum* &c. Barr. Ic. 123. t. 62.—Shr. per. Mad. reg. 1 and ND. c. Sea-cliffs to the E. of Funchal along the Caniço road beyond the 1st ravine (Louros) and up the S. Gonçallo and other ravines at Funchal for about a mile above the sea; cliffs above the Cemetery at S. Vicente and descending to the Rocha do Navio at S^{ta} Anna; central ridge at the top of ND. Febr.–June, but almost at all seasons; fr. May, June.—An evergreen upright shr. 4 or 5 ft. high, with bright shining full or often yellowish gr. more or less stiff and coriaceous foliage. St. quite self-supporting virgate woody and erect. Branches brown stiff woody round but striate or subangular. Petioles ½–1 in. long, petiolules of the 2 side-lfts. very short or none, of the terminal larger lft. 2–6 lines long. Lfts. dark shining gr. above, paler beneath very variable in shape, ranging from rounded to lanceolate and from retuse to acute, the terminal one 1–2 in. long and about half as broad, the 2 side-lfts. mostly nearly or quite sessile. The lower l. are sometimes 1-foliolate and the upper rarely 5-foliolate or with 2 pairs of side-lfts. Fl. bright rich golden y. rather larger than in *J. fruticans* L., in small few-fld. cymes aggregate at the ends of the branches, fragrant, equally by day and night in Mad., like those of Clover (*Trifolium pratense* L.), but not powerfully or so as at all to warrant the specific name. Lobes of cor. shorter than the tube, rather broadly oval or elliptic, laterally imbricate, more or less obtuse; the tube 4–6 lines long, limb about 3. Cal. (including its teeth) 1–1½ line long. Fr. (from ND. spec.) large handsome and conspicuous in thick bunches or panicles, each con-

sisting of a pair of horizontally spreading shining oval drupe- or berry-like lobes united at their base (one often abortive) of a dull livid greenish-olive colour with a pale watery or pellucid waxy appearance like a Mistletoe-berry (or dried Litchi fr. with the outer shell or crust removed), dark in the middle from the black central seeds shining through the pellucid watery or juicy pulp and thin smooth skin; each lobe 5 or 6 lines long, 3 or 4 in diam., mostly both 2-seeded and only by abortion one of them 1-seeded. Seeds intense black like charcoal, large elliptic-oblong pointed at each end, 4 lines long, 2–3 broad, mostly flattened and quite plain and even (as if cut with a knife) towards each other, more or less convex at the back, and lying, like 2 thickened scales, closely face to face.

Though the fr. is sweetish juicy and not unpleasant to the taste, with a strong flavour of paregoric or laudanum, it is strange that, even in a place so nearly destitute of food as the N. Deserta (where it abounds), neither lizards, birds nor men appear to touch it. Yet it is not reputed to be poisonous, though from its botanical affinities, besides the above fact, it must be regarded with suspicion.

The ND. pl. is a mere maritime form of the sp., of a stiffer more stoutly branched habit, with excessively thick and leathery more rounded l. and larger handsomer fl. than in the Mad. pl.

Webb (Phyt. Can. iii. 166) says that the fr. is not larger than a pair of barley-corns; and on this ground, with others less important, rejects the syn. quoted by Linn. of Ferrari; who however describes it to be, exactly as in the ND. Mad. pl., of the size of small olives (*delle ulive piu piccole*). I have gathered Webb's pl. in Tenerife, Palma and Hierro; but I have no note about the fr., and only this remark about the fl. of the Hierran pl., viz. that they are "fragrant, but not like Clover," as they are in Mad. Is then the Can. pl. possibly distinct from the latter? Lamarck compares the fragrance in his pl. to that of Jonquils.

The objections against changing the name of *J. azoricum* L. apply *à fortiori* to the present sp.

Order LVII. MYRSINACEÆ.

Fl. perfect regular (rarely diclinous) 4–6- or 7- mostly 5-merous. Cal. gamosepalous 4–6-fid or -partite persistent. Cor. mostly gamopetalous 4–6-lobed or partite. Æstivation various,

mostly twisted. Stam. as many as and opposite cor.-lobes. Anth. 2-celled mostly erect introrsal. Style simple. Ov. mostly free 1-celled with few (5–1) or many amphitropal ovules immersed or imbedded in the pits or cells (*alveolæ*) of the free central *placenta*. Fr. a dry thinly fleshy mostly small globose drupe or berry. Seeds rarely numerous, mostly one and then globose peltate i. e. umbilicate or concave at the base or *hilum*, clothed with the placental membranes and almost entirely consisting of horny or fleshy albumen enclosing the mostly cylindric straight or curved embryo lying across it transversely or parallel to the *hilum*.—Partially resinous tr. or shr. L. without stip. coriaceous evergreen, simple mostly alternate and entire. Fl. small w. or pink rarely yellowish or greenish.—Differs from *Primulaceæ* merely in its indehiscent baccate or mostly drupaceous fr. and woody st. or shrubby or arboreous habit.

Tribe I. *ARDISIEÆ.*

Cor. gamopetalous. Ov. free wholly superior. Ovules indefinite few or many. Fr. 1-seeded. Seed clothed with the placental membranes, umbilicate or excavated at the base.

1. ARDISIA. Cal. 5–4-fid or -partite. Cor. 5–4-partite rotate, lobes patent or reflexed imbricate and twisted, rarely valvate, in the bud. Stam. distinct inserted into the base or throat of the short cor.-tube; fil. free mostly short; anth. erect free bilobed or cordate at the base. Style filiform subulate. Ovul. numerous radiant in concentric rows or stages round the *placenta*, all but one (very rarely 2 v. 3) early abortive. Drupe thinly fleshy.—Fl. mostly cymose or paniculate rarely fascicled.

Tribe I. *Ardisieæ.*

1. ARDISIA Sw.

§ *Heberdenia*; lobes of cor. valvate in bud, their edges velvety-pulverulent. Anth. shorter than their fil. acute bursting by a longitudinal slit. Style subulate as long as stam.—Inflorescence lateral aggregato-fasciculate.—(§ 1. *Parathesis* DC. proxima.)

1. A. EXCELSA Ait. *Aderno.*

L. obovate-oblong stiffly coriaceous smooth entire reticulately veined and punctate on both sides; pedic. fasciculate or aggregate in more or less dense tufts on short lateral spurs (undeveloped or abortive branchlets) below the l. of the present year; lobes of cal. ovate, of cor. linear-lanceolate patent 3 times the length of cal.-lobes.—Ait.! H. K. (ed. 1) i. 261, (ed. 2) ii. 5; Pers. i. 233; Spr. i. 662. *Heberdenia excelsa* Sol.! in BH.;

DC. viii. 106; WB. iii. 169. t. 188. *Leucophylon* (an error or misprint for *Leucoxylum* Sol.) *excelsum* Buch! 193. no. 206. *Anguillaria excelsa* and *A. bahamensis* ("Gaertn. t. 77. f. 1") Lam. Ill. ii. 110; Poir. in Lam. Dict. vii. 688 and Suppl. v. 313. *Icacorea* Lam. Ill. t. 136. f. 1. (fr. only). *Condalia coriacea* Reichb. in Holl! List in J. of Bot. i. 39 (not *Rhamnus coriaceus* Nees von Esenb. or *R. integrifolius* DC.).—Tr. per. Mad. reg. 3, ♂♀. Rib. Frio, Rib. da Metade, do Fayal, Serra de Machico, do P^to^ da Cruz, da Rib. da Janella, do Seixal, about the Cruzinhos, on Pico Grande, &c. Fl. July–Sept.; fr. Nov. mostly. —Growing amongst other forest-tr. the Aderno rises to a height of 50 or 60–80 ft. with a cylindric or pyramidal head; but single or detached tr. are not above 20–30 ft. high with a compact thick rounded bushy head like an Orange-tr. Trunk straight cylindric, in small detached tr. 5–10 ft. high without branching, in the taller 2–3 ft. in diam., covered like the branches with an even smooth light grey or whitish-ash-coloured bark. Branches rather unusually brittle, very rugged with the large scars of the fallen l. and with pale grey raised lenticels, ending proliferously in subcorymbose leafy tufts of shoots or branchlets, which, like the buds, petioles, fl.-spurs and pedic., are ferruginous and slightly furfuraceous whilst young. L. all suprafloral on the short corymbose proliferous tufted shoots or branchlets of the present year 2–3 in. long, half as broad, hard rigid coriaceous shining rather light gr. above, paler and without lustre beneath, simply 1-ribbed, sprinkled with minute raised glandular dots and reticulately veined on both sides, their sharp pellucid margins sprinkled with minute deep-red glandular dots, mostly quite entire or only very rarely, and chiefly in young vigorous seedling plants or shoots, with a few teeth upwards; either acute, obtuse or retuse, often cymbiform, mostly more or less revolute and waved at the edges, but always obovate towards the base and attenuated more or less into the short petioles, which are scarcely 3 lines long, ferruginous, and sprinkled like the young shoots and prominent midrib of the l. beneath with very minute dark red dots and lines or clefts. Fl. small pale gr. or yellowish gr. scentless, produced in small scattered subcorymbose more or less dense and globose tufts or fascicles on very short woody spurs below the l. on all sides of the naked branches of the preceding year, or rarely also in the axils of the lower l. on the leafy young shoots. These spurs have often a terminal bud, which, after fl., shoots out into a branch, and sometimes are so crowded that the whole branch below the l. is clothed all round with fl. Each spur bears from 2 or 3 to 7 or 8 round smooth 1-fld. pedic. 2–3 lines long in a terminal tuft, with often several rather longer clustered lateral ones below them: all widely divaricate and furnished with a small deciduous brown bractlet at the base. Thus the inflo-

rescence is almost precisely that of *Ilex Perado* Ait. or of *Catha Dryandri* Lowe. Cal. cleft rather more than $\frac{2}{3}$ down into 5 or rarely 4 permanent half-ovate rather thick and fleshy subobtuse teeth, slightly imbricate only at the base, rugose and sprinkled with minute red dots, exactly the length of the ov. Cor. deeply 5- or rarely 4-fid, segments in bud perfectly valvate! forming an obtuse 5- or 4-angular cone or pyramid; in fl. spreading stellately but scarcely reflexed, with the tips very slightly if at all spirally contorted, narrow-lanceolate or acuminato-ligulate, of a thickish spongy substance, bright gr. outside, pale yellowish and appearing covered on first opening with a whitish mealy coat inside, about two lines long or 3 times the length of the sep. and so deeply cleft as to appear like distinct pet., being united at the base only by a narrow ring which is concealed by the cal. Stam. 5 or rarely 4, opposite but shorter than the pet., ascending and slightly converging; fil. broad flattened gr., inserted on each pet. just above its junction with the next; anth. large a little shorter than their fil., pale yellowish. Style simple taper-pointed, as long as the smooth turbinate or depresso-globose subprismatic i. e. 5–4-angular rugose 1-celled ov. Ovules numerous radiant, all but one almost from the first abortive. Fr. a small hard subdepressedly globose 1-seeded berry-like drupe, 3–4 lines in diam., smooth shining with sometimes a slight bloom, at first bright reddish purple, then dark purplish black, scarcely at all succulent, crowned with the subulate persistent more or less worn-down style. Flesh thin (a mere skin) with no pulp and very little juice. Taste subastringent with but very little sweetness, yet in the neighbourhood of the Jardim da Serra occasionally eaten by children, and in the Canaries reported by Webb to be made into a conserve, which, however, he adds, is solely indebted to a quantity of sugar for any good qualities it may be considered to possess. Immediately beneath and in close adherence with the thin and nearly juiceless skin or sarcocarp is the pale brown crustaceous shelly thin and brittle smooth and even seed-coat (*testa*), lined with a thin chestnut-brown smooth skin or pellicle, which is easily separable both from the shelly *testa* and the seed or kernel which it immediately envelopes, and which consists almost entirely of hard corneous subpellucid bluish w. albumen, and is peltately depresso-globose or cushion-shaped with a very large roundish umbilical pit or cavity beneath (*hilum*) filled with a brown spongy and partly woody mass, the surface smooth and even except a few irregular erose pits or sinuous cavities, like those on the surface of an Almond-shell (*Amygdalus communis* L.), filled with a friable brown spongy substance. The depth of the umbilical pit is half that of the seed itself, and its width one third of the diam. of the same; its margins are obtuse, slightly 5-lobed and wrinkled, with the

bottom flat. Embryo pure w. cylindric slender straight or slightly curved, lying transversely across the centre and distinctly visible through the subpellucid substance of the bluish w. albumen parallel to the *hilum*.

The wood of the Aderno is w., splitting or cleaving readily longitudinally, and not particularly hard or solid, but not breaking easily across, and therefere probably elastic—resembling on the whole a good deal that of the Ash (*Fraxinus excelsior* L.). Indeed in Machico it is much esteemed even for the keels of boats, and formerly, as Dr. Heberden told Solander, was used for the staves of casks, though now, and for the last 70 or 80 years, entirely superseded for the last named purpose by American Oak. The fr. is produced abundantly, but is not much devoured even by birds. In fact it is almost quite fleshless and very dry and insipid. It ripens mostly in Nov., but occurs also partially at other seasons.

Though scarcely met with now below 3000 ft., the Aderno formerly grew quite down to the level of the sea. On the Ilhéo do P^to^ da Cruz, a small isolated rocklet off the port or promontory of the town, there existed formerly a conspicuous Aderno tr., from which in Oct. 1829 I gathered spec. in fr. This tr., which was of some note or celebrity amongst the people of the place, was destroyed by the great storm of wind in Oct. 1842. On the same rock in 1829 grew also shr. of *Olea europæa* β and of *Sideroxylon Marmulano* Lowe.

The leaf-impressions figured by Prof. Heer (Foss. Pl. of S. Jorge p. 28, t. i. ff. 19–23) under the name of *Myrica Faya* L., assuredly belong rather to the present pl.

Solander himself, in Ait. Hort. Kew. ed. 1, suppressed his own MS. genus *Leucoxylum* or *Heberdenia*, founded on this pl., in favour of the then just previously published *Ardisia* Sw.; nor can I discover in the Mad. pl. any sufficient ground for its revival. The inflorescence is indeed peculiar; but in *Ardisia* Sw. it is also most variable.

Order LVIII. PRIMULACEÆ.

The Primrose Family.

Like MYRSINACEÆ, but herbaceous and mostly stemless with non-coriaceous l. and capsular dehiscent many-seeded fr.

Seeds (except in *Hottonia* L.) amphitropal, the embryo parallel to the *hilum*.

Tribe I. *ANAGALLIDEÆ.*

The Pimpernel Tribe.

Caps. a superior free *pyxid*, circumscissilely dehiscent. Seeds amphitropal, hilum ventral.—St. branched rarely suffrutescent.

1. ANAGALLIS. Cal. 5-partite persistent. Cor. larger than the cal. rotate deeply 5-partite without tube or almost 5-petalous but caducous entire. Stam. 5, fil. hairy.—L. opposite or alternate, fl. axillary solitary.

Tribe II. *SAMOLEÆ.*

The Brook-weed Tribe.

Caps. half-adherent to cal. semisuperior valvately dehiscent. Seeds amphitropal, hilum ventral.—Smooth succulent semi-aquatic herbs with small w. scentless fl.

2. SAMOLUS. Cal.-tube adherent to the ov. 5-fid persistent. Cor. perigynous at top of cal.-tube rotate or cup-shaped with a short open tube, limb 5-partite spreading, lobes with intermediate scales (barren stam.), caducous entire. Stam. perigynous, 5 fertile internal opposite cor.-lobes, 5 barren alternate external. Ov. half-inferior. Caps. half-sup. 5-valved, bursting at top with 5 teeth.

Tribe I. *Anagallideæ.*

1. ANAGALLIS L.

Pimpernel.

1. A. ARVENSIS L. *Murrião.*

Ann. smooth; st. herbaceous prostrate or procumbent 4-angular; l. sessile opposite and decussate or ternate, oval or lanceolate; pedic. slender as long as or longer than the l.; sep. lanceolato-acuminate with membranous edges; pet. rounded erosulo-denticulate and glanduloso-fimbriate, laterally close subimbricate, scarcely longer than the sep.; caps. nearly as long as the sep.—Desf. i. 168; DC. viii. 69; WB. iii. 171; Seub. Fl. Azor. 40; Coss. et Germ. i. 242; Gren. et Godr. ii. 467; Bab. 268; Willk. et Lange ii. 648.—Herb. ann. Mad., PS., Des., reg. 1, 2. Cornfields, roadsides and waste ground. Varr.:—

a. phœnicea WB. l. c.; Coss. et Germ. l. c.; Gren. et Godr. l. c.; st. subequilaterally 4-angular, often somewhat weak and

slender, spreading or ascending, fl. scarlet with a violet-purple eye.—*A. arvensis* a Bab. 269. *A. arvensis* Linn.! Herb. and Sp. 211; Fl. Dan. t. 88; EB. t. 529; Pers. i. 173. no. 1; Ait. Hort. Kew. (ed. 2) i. 316; Buch 192. no. 159; Hook. Fl. Scot. i. 72; Sm. E. Fl. i. 280; Koch 668. *A. phœnicea* Lam. "Fl. Fr. 285," Dict. iv. 335. no. 1, Illustr. 441. no. 1983, t. 101; Brot. i. 262; Spr. i. 570. *A. mas* Vill. Dauph. ii. 461.—Mad. reg. 1, rr. Funchal about the Valle; Machico about and above the E. Fort; at foot of sea-cliffs, Campanario; P^to^ da Cruz, ascent of the Penha d'Agua, N.W. side. Nov., May.—Precisely the common English or European "Red Pimpernel;" nor in the Mad. pl. can the least difference be discovered between it and var. γ, except in the colour of the fl., the more nearly or quite equilaterally 4-angular st. and less distinctly subauriculate or cordate mostly narrower or smaller l.

β. *cærulea* Coss. et Germ. l. c.: Gren. et Godr. l. c.; like a, but fl. bl. or sometimes w. or lilac.—*A. arvensis* β Fl. Dan. t. 1570; Bab. 269. *A. cærulea* "Schreb. Spicil. Fl. Lips. 5;" EB. t. 1823; Lam. Dict. iv. 336. no. 2, Ill. 442. no. 1984; Brot. i. 262; Pers. l. c. no. 2; Hook. l. c. 72, 73; Sm. E. Fl. i. 280, 281; Spr. i. 570; Koch 669. *A. fœmina* Vill. l. c. *A. Monelli* Linn.! Herb. and Sp. Pl. 211.—Mad. reg. 1, rrr. Cornfields above the Brazen Head; Campanario at foot of the sea-cliffs at the port or Ilheo, mixed with a, with which it agrees in habit and size of fl. Apr., May.—Precisely the English or European "Blue Pimpernel." Pet. in the Mad. pl. as glandulose at the edges as in a, and not as Koch l. c. says, eglandulose. Habit, st., l. and fl. in size, and every thing except colour, as in c, but passing into γ by imperceptible gradations and really nothing more than a depauperated state of it.

γ. *latifolia* Willk. et Lange l. c.; mostly altogether stouter or more robust and succulent and brachiately branched, with st. decussately broader or compressed alternately between the nodes, broader subauriculate or subcordate strongly 3-nerved l., and fl. rather larger and deeper or fuller bl. than usually in β, with a deep rose-purple eye.—*A. latifolia* Linn.! Herb. and Sp. 212 (excl. syn. Barr. t. 584) *descr. opt.* Lam. Dict. iv. 336. no. 3, Ill. 442. no. 1985, Brot. i. 263; Pers. l. c. no. 8; Ait. l. c. 317; Spr. l. c.; BM. t. 2389; DC. viii. 70. *A. arvensis* J. A. Schm. Fl. Verd. 250 (excl. syn. plerisque). *A. arvensis* β. *cærulea* WB. iii. 172 (excl. syn. plerisque). *A. cærulea* Chr. Sm.! in Tuckey's Voy. 252; Webb Spic. Gorg. 169 (nec Schr. nec aliorum). *A. Monelli* var. *Willmoreana* BM. 3380 (status cult. valde luxurians).—Mad. and PS. reg. 1, 2, c; GD. and SD. reg. 2, c. Roadsides, waste ground and borders of cornfields about Funchal and elsewhere, general. Machico about and above the E. Fort intermixed with a, and at the Piedade;

PS. between the town and Fonte d'Aréa and ascent of Pico Debaixo; GD. and SD. at top. Nov.–June, but chiefly Apr., May.—Merely a large luxuriant form or state of *α* or *β*. Root long thin simple ann. Primary st. erect, 2 or 3 in. high, throwing out brachiately from the axils of the l. long trailing prostrate or decumbent branches which are again remotely or sparingly branched chiefly towards their base, the ends ascending; all sharply and inequilaterally 4-angular, with the 2 opposite sides alternately between each pair of l. broader and narrower, and the branches always springing from the bottom of the narrow grooved sides or top of the broad flat pair of the internode below. Hence the branches are decussately compressed, with alternately opposite broad flat and narrow grooved sides, the latter with prominent sharp edges. L. in pairs, decussate, broadly ovate or ovate-oblong, 6–8 or 9 lines long, 4–6 broad, waved and subauriculate or subcordate at the base and perfectly sessile, their base occupying the whole breadth of the broad flat sides of the branches, but not semiamplexicaul, pale gr. and quite smooth like the st., dotted beneath with pale purple, strongly 3-nerved, quite entire but through the lens minutely crystallino-erosulate. Pedic. solitary filiform or capillary, as long as or longer than the l., deflexed in fr. Sep. very narrow lanceolate finely acuminate shorter than the cor., their edges w. pellucid membranous either entire or very minutely and irregularly serrulate; keel strong pellucid and distinctly crystallino-serrulate or crenulate. Fl. conspicuous, rather larger than in *α*, sometimes very much so, not closing after being gathered, but becoming strongly deflexed, cor. of a very rich deep bl., rather paler outside, with a ring of bright deep rose-purple inside at the throat or base of pet.; the latter broadly obovate or roundish subtruncate or obtuse, laterally close together or subimbricate, their edges finely erosulo-denticulate and fringed with numerous very short minute capitate pale purple glands, falling unitedly. Fil. often connivent in the middle above the ov. like an hour-glass, densely villous w. below, bright red-purple upwards, their hairs purple thickened upwards or subcapitate. Anth. bright chrome-y. Ov. rather long subcapitate, style smooth, the latter bright rose-purple; stigma simple capitate greenish or y. Caps. smooth globose pale brown shorter than the sep., crowned by the persistent style. Seeds dark brown sharply 3–4-angular, minutely granulato-rugose exactly as in *α* or *β*.

When starved or drawn up or otherwise depauperated, or even when far advanced in fl., passing completely into *β*.

A. Monelli BM. t. 319 seems to differ only in the more narrowly obovate remote or distinct (not laterally imbricated) pet.,

which are figured quite as eroso-denticulate as in the Mad. pl. Indeed, not only *A. latifolia* L., but also *A. Monelli* and *linifolia* L. et Auct. and *A. collina* Schousb. seem to be merely casual or local aberrations from or cult. states of *A. arvensis* L. *a* supra. Not one of the characters usually assigned to them respectively is constant; unless it should prove to be that of the lateral remoteness (as in *A. Monelli* BM. t. 319 and Barr. t. 584), or imbricating closeness (as especially in *A. arvensis* γ supra), of the pet.

Duby in DC. l. c. rightly refers *A. Monelli* Herb. L. on Sweet's authority to *A. arvensis* L. The spec. agrees entirely by its slender habit and pale bl. fl. with var. β supra.

Tribe II. *Samoleæ.*

2. Samolus L.

Brook-weed.

1. Samolus Valerandi L.

St. erect virgate leafy, branched chiefly upwards; lower l. rosulate spathulate obtuse stalked, upper more or less acute and subsessile; fl. in simple or branched and subcompound erect terminal many-fld. finally elongated rac.; ped. 1-fld. 1-bracteate at top, pedic. as long as or longer than the ped.; cor. twice the length of the subacute broadly ovate sep.; stam. included short, the barren as long as the fertile; ov. half-adnate; valves of caps. not reflexed at tip.—Linn. Sp. 243; Fl. Dan. t. 198; Vill. Dauph. ii. 463; Lam. Dict. vi. 486, Ill. i. 443. no. 1990, t. 101; Desf. i. 183; EB. t. 703; Brot. i. 286; Pers. i. 171; Ait. H. K. (ed. 2) i. 365; Hook. Fl. Sc. i. 80; Sm. E. Fl. i. 323; Spr. i. 702; WB. iii. 175; Koch 681; DC. viii. 73; Coss. et Germ. i. 242; Gren. et Godr. ii. 468; Bab. 269; Willk. et Lange ii. 650. —Herb. per. Mad. reg. 1, 2, c. Moist dripping rocks, chiefly on the sea-cliffs all round the coast, but occasionally also in ravines of the interior. Sea-cliffs along the road from Rib. Brava to P^ta^ do Sol, beyond Calheta, at Paul do Mar above the waterfall, at S^ta^ Anna, S. Vicente, &c. and descent into the Curral das Freiras (east side) &c. May–Sept.—Smooth shining bright gr., rarely subglaucescent. Root short præmorse emitting numerous w. simple fibrous radicles. St. firm stiff, harder and more solid than in the British pl., about a foot high. L. 1½–2 in. long, ½ in. broad. Fl. small w. inconspicuous scentless. Ped. and pedic.

slender erecto-patent, with a slight bend or knee in or below their middle subtended by a small l. or linear br.

Of the familiar British or European Tribe LYSIMACHIEÆ, *Asterolinum Linum-stellatum* (L.) DC. viii. 68 (*Lysimachia*, Brot. i. 264) has been found abundantly in the Great Salvage, as also here and there in the Canaries (Tenerife and Grand Canary), but it has not hitherto occurred in Mad. It is an insignificant weedy ann. pl., resembling *Stellaria uliginosa* Murr., with small w. fl., and growing mostly in thick tufts or masses.

No pl. of the normal Tribe in this Order, PRIMULEÆ (Primrose *proper*), has been found either in Mad., the Açores, the Canaries or Cape-Verdes: and the common Primrose (*Primula vulgaris* Huds.=*P. acaulis* Jacq.=*P. grandiflora* Lam.) is only preserved with difficulty in a few English gardens in Mad.

Order LIX. GENTIANACEÆ.

The Gentian Family.

Fl. perfect regular or slightly irregular, mostly 4–5-, rarely 6–12-fid. Cal. free gamosepalous persistent, lobes valvate or contorted. Cor. gamopetalous hypogynous (very rarely bilabiate), lobes alternate with those of cal. imbricately twisted in bud, sometimes induplicate or plaited, mostly persistent marcescent. Stam. as many as and alternate with cor.-lobes, inserted in its tube or throat. Ov. free single of 2 concrete carpels either 1-celled or imperfectly 2-celled, many-ovulate. Stigm. 2 or 1, with or without a distinct persistent or deciduous style. Ovules anatropal. Caps. 2–1-celled (rarely 4-celled or baccate) mostly 2-valved septicidal with parietal placentas. Seeds numerous minute. Embryo minute straight axile in the middle of the fleshy albumen.—Smooth rarely frutescent herbs with bitter tonic properties, not milky. L. mostly simple entire opposite or whorled, palmate-nerved, often rosulate at the base of the fl.-st., without stip. Inflorescence mostly centrifugal; fl. mostly scentless, often handsome p., b., w. or y.

Tribe I. *GENTIANEÆ.*

Cor.-lobes twisted dextrally in bud. Coat of seed (*testa*) membranous; alb. filling it entirely.—L. opposite simple or undivided entire.

Subtribe 1. *Chloreæ.*

Anth. with a connective. Style distinct caducous.

1. ERYTHRÆA. Cal. tubular 5–4-angular 5–4-partite, lobes linear flat simple. Cor. hypocrateriform, tube slender constricted at the throat, limb stellately 5–4-partite. Anth. erect exserted presently spirally twisted. Style distinct deciduous. Stigmas 2 more or less coherent or capitate. Caps. linear 2-valved imperfectly 2-celled by the inflexed spongy placentiferous margins of the valves.—Ann. herbs with square or angular st., opposite connate 1–3–5-nerved l., dichotomous terminal cymes and elegant small lively pink rarely w. or very rarely y. fl.

Tribe I. *Gentianeæ.*

Subtribe 1. *Chloreæ.*

1. ERYTHRÆA Renealm.

§ 1. *Eu-erythræa* Griseb.; fl. p. or rose, rarely w., style simple, stigma capitate bifid, formed of 2 half-balls or half-ovoids, much shorter than the style. Cyme dichotomous, fl. stalked.

1. E. PULCHELLA (Sw.).

St. erect slender repeatedly 2–3-chotomously branched leafy often bushy, lower l. not rosulate, oval oblong or ovate-oblong obtuse mucronulate, upper narrow-oblong lanceolate or elliptic acute; fl. all shortly pedicelled, ebracteate solitary in the forks and terminal, not fascicled, forming a large lax leafy subremotely many-fld. fastigiate cyme; sep. finely linear-acuminate, at first as long as and afterwards only a little shorter than cor.-tube, lobes of cor. narrow elliptic-oblong subobtuse, "caps. 1-locular" (DC.).—Hornem. Fl. Dan. t. 1637; Hook. Fl. Scot. i. 79; Sm. E. Fl. i. 322; Koch 567; Coss. et Germ. i. 258; Gren. et Godr. ii. 483; Bab. 221; Willk. et Lange ii. 661. *E. pulchella a*, caule ramosissimo, and *b*, caule simplici Fr. Nov. Fl. Suec. 74. *Erythræa ramosissima* Pers. i. 283 (excl. var. β); Spr. i. 579; DC. ix. 57; Webb Spic. Gorg. 150; J. A. Schm. Fl. Verd. 216; Griseb. W. I. Fl. 422; RFG. xvii. 13, t. 20. f. 5. *E. Centaurium* WB.! iii. 19 (not Pers. and excl. syn.). *E. pyrenaica* Pers. i. 283 (var. fl. albis). *Gentiana Centaurium* β Linn. Sp. 333; Lam. Dict. ii. 641. "*G. pulchella* Sw. Act. Holm. (1783) 85 (84 in Willd.) t. 3. ff. 8, 9." *G. ramosissima* Vill. Dauph. ii. (1787) 530; Brot. i. 276. *G. palustris* Lam. Ill. i. 486. no. 2221. *Chironia pulchella* EB. t. 458; Willd. i. 1067 (caule simplici unifloro). *C. inaperta* Willd. i. 1069. *Centaureum* (sic) *autumnale* Chr. Sm.! in Tuck. Voy. 252 (caule subsimplici 1–3-floro). *Centaurium minus palustre, ramosissimum* Vaill. Par. 32, t. vi.

f. 1. Obs. the two states of this pl. viz. *a*, with a many-fld. repeatedly branched bushy st., and *b*, with a simple 1–3-fld. st., mixed up in the preceding syn., are not worth distinguishing; the latter being a mere depauperated form of the pl.—Herb. ann. Mad. reg. 1, rrr. Machico towards and about the old Fort on the E. side of the bay; Paul do Mar above the Waterfall. June, July.—Whole pl. smooth, varying greatly in size and luxuriance from 1 or 2 to 12 or 15 in. high, but normally from 6–9 or 10 in. St. straight stiff erect leafy throughout and not chiefly at the base, mostly branched all the way up from the base, and bushy with the branches rising to the same height, but sometimes simple and 1–3-fld., or branched only upwards and few-fld. Foliage copious light gr.; st.-l. large and close-set, 6–12 lines long, 3–6 broad. Fl. rather small and delicate bright rose-pink, very numerous in well-grown pl., not crowded or congested by themselves, but dispersed in a broad leafy level-topped cyme of l. and fl. intermixed. Br. none except the floral l. at base of pedic. Cor.-limb 3–4 lines in diam., exserted about 2 lines beyond the finely acuminate (not aristate) tips of sep.; base of its limb or throat abruptly w. like its long slender tube; lobes mostly 5 distinct (not laterally imbricate), rather narrow, elliptic or lanceolate, nearly or quite 2 lines ($3\frac{1}{2}$–4 mill.) long, $1\frac{1}{2}$ mill. broad, bright rose-pink. Anth. pale y. exserted to or beyond base of cor.-lobes; fil. finely capillary w. Style and stigma 3 mill. long or half the length of ov. and reaching to base of cor.-lobes; stigma very distinctly capitate subobovate finally dark-coloured; style purplish. Caps. subunilocular, the length of cal.

The EB. fig. above quoted gives a very imperfect idea of the usual habit and appearance of this pl., having been evidently drawn from a depauperated, starved or stunted spec.

§ 2. *Xanthæa* Reichenb.; fl. y.; style simple, stigma elongato-capitate or clavate formed of 2 erect parallel distinct linear-oblong lamellæ, as long as the style itself. Cyme dichotomous. Valves of caps. subinflexed.

2. E. MARITIMA (L.).

St. stiffly erect straight fork-branched from the base or at top only, not bushy or leafy, lower l. not rosulate small soon withering obtuse, upper ovate, oval, or ovate-oblong, acute, uppermost or floral lanceolate; cyme or pan. few-fl. lax irregular 2–3-chotomous stiffly erect, fl. dispersed, of different height or rarely fastigiate, all distinctly stalked; sep. acuminato-aristate as long as cor.-tube; lobes of cor. ovate-oblong or elliptic subobtuse; stigma clavate rising above the stam.—Pers. i. 283; WB. iii. 20,

21; Koch 567; DC. ix. 60; Gren. et Godr. ii. 486; Willk. et Lange ii. 660; RFG. xvii. 14, t. 20. f. vi. (but fl. full y.). *E. occidentalis*, *E. maritima* and *E. lutea* Roem. et Schult. iv. 171. *Gentiana maritima* Linn. Mant. 55; Brot. i. 278; Cav. Ic. iii. 49, t. 296. f. 1. *Chironia maritima* Willd. i. 1069; Fl. Gr. t. 237. *Centaurium minus luteum latifolium* &c. Barr. t. 468.—Herb. ann. Mad. reg. 3 (lower part), r. Bare open sunny mountain-pastures at top of the Caminho do Meio about the Pico da Silva in the short turf here and there, not uncommon; "about the Fort or Pico do Arrebentão," S^r^ Moniz. June.—A small short-lived pl. with conspicuous fl. altogether smooth, varying much in size and luxuriance. Root small nearly simple flexuous w. stiff slender. St. 4-angular about 6 in. high and 6–12-fld. with stiffly erect forked fl.-branches, often by depauperation simple 2 or 3 in. high and 1–2- or 3-fld. L. rather small and inconspicuous, especially the lower, of a shining rather dull or pale gr., all 3-nerved sessile and entire, the lower short obtuse, the upper longer and acute, the midrib distinct, the 2 side-nerves faint. Fl. in Mad. pale lemon-y. very erect elegant, their tube ½ in. long and expanded limb the same in diam., all on short 4-angular pedic. ¼ in. long and thickened upwards, at first terminal, but presently, by the production of a branch on each or only one side from the axils of the pair of l. at the base of each fl., becoming either alary or lateral, forming a stiffly erect irregular not close or crowded or many-fld. or constantly fastigiate cyme. Cal. acutely 5-angular, the angles produced into fine long slender hair-like points or awns as long as its tube. Limb of cor. funnel-shaped, tube greenish slender striate, nearly or quite as long as awns of cal., limb fine pale lemon-colour, expanding stellately, but closing about noon or in cloudy weather; lobes 5 elliptic, 2–3 lines long, 1–1½ broad. Stam. just exserted beyond the tube, anth. golden- (somewhat or.-)y. Style reaching to top of stam. where it divides into 2 large erect oblong flattened adpressed lemon-coloured stigmas, about a line long, forming a club overtopping the anth. by nearly or quite its whole length. Caps. longer than the cal.

Of LOGANIACEÆ, which are little more than *Rubiaceæ* with a free ov., *Buddleia globosa* L., BM. t. 174, a subarborescent shr. 12 or 15 ft. high, with square w.-tomentose young shoots, opposite long acuminato-lanceolate reticulato-rugose l. dark gr. above, snow-w. beneath, and stalked small balls of bright reddish-orange strongly scented flowers, occurs about cottages or in garden-hedges at the Palheiro and Camacha, seminaturalized.

††Order LX. APOCYNACEÆ.

The Dogs-bane, Periwinkle and Oleander Family.

Fl. perfect regular 5-merous 5-androus. Cal. 5-partite persistent. Cor. hypogynous gamopetalous funnel-shaped or salver-shaped, deciduous, lobes in bud imbricate twisted, rarely valvate. Stam. 5 inserted on cor.-tube with mostly very short free fil., pollen granular. Ov. superior free, of 2 separate or connate cells with ventral sutural placentæ; ovules mostly numerous amphitropal or anatropal. Style single, composed of 2 coherent into 1, mostly thickened or dilated upwards. Fr. 1–2, follicles or capsules, sometimes drupaceous or baccate, 1– many-seeded. Seeds compressed mostly pendulous, sometimes comose, sometimes winged; hilum ventral or basilary; cot. leafy; embryo straight mostly enclosed in a fleshy albumen.—Mostly tr. or shr., rarely per. herbs, with milky juices and poisonous or noxious qualities. L. mostly opposite, sometimes 3–4-nate, simple, entire, without stip. Fl. mostly cymose, conspicuous, often fragrant.

††Tribe I. *PLUMIERIEÆ.*

Ov. 2, distinct; ovules affixed to their inner angle, amphitropal. Seeds naked (without beard or coma).

††Subtribe 1. *Tabernæmontaneæ.*

Alb. even (not ribbed or ruminate).

††1. VINCA. Cal. 5-partite. Cor. salver-shaped, mouth of tube with a raised 5-angular erect rim crown or border, throat downwards closed with hairs, limb obliquely 5-partite, lobes cuneiform obliquely truncate. Stam. included, anthers connivent, fil. short geniculate, dilated upwards. Stigma a flat orbicular disk or rim-like ring with a central conical papilla tufted with hairs at the tip. Hypog. glands 2, alternate with the 2 ov. Fr. 2 erect follicles. Seeds naked.—Per. suffrutescent herbs, not milky !, with mostly sarmentose st. or runners, opposite entire l. and handsome solitary axillary scentless b. v. or w. fl.

††Tribe I. *Plumierieæ*.

††Subtribe 1. *Tabernæmontaneæ*.

††1. VINCA L.

Periwinkle.

††1. V. MAJOR L.

Barren st. diffusely spreading or decumbent, flowering suberect, all gr. smooth slender sarmentose; l. ovate or ovate-lanceolate subacute often subcordate at the base, the edges alone shortly ciliato-pubescent, petioles 2-glandular at top subciliate at the edges; cal.-lobes linear ciliate nearly as long as cor.-tube; pedic. shorter than the l.; cor.-lobes obliquely cuneato-rhomboidal and truncate.—Linn. Sp. 304; Vill. Dauph. ii. 486; Lam. Dict. v. 198; ejusd. Ill. t. 172. f. 1 (fl. only); Desf. i. 206; Pers. i. 267; EB. t. 514; Sm. E. Fl. i. 339; Spr. i. 638; Koch 557; DC. viii. 384; Coss. et Germ. i. 251; Gren. et Godr. ii. 477; Bab. 219; Willk. et Lange ii. 666 (not Brot.).—Herb. per. Mad. reg. 2, cc. Perfectly naturalized in Chestnut woods and shady places at the Mount, S. Antº da Serra about the Church, Arco de S. Jorge, S. Vicente, &c. Feb.-May.—St. numerous tufted 1–2 or 3 ft. long round hard rigid simple, the barren arcuate declining, the flowering shorter more erect, all ultimately here and there rooting at the joints and copiously leafy. L. opposite shortly stalked dark gr. subcoriaceous shining quite entire smooth except at the edges, 1–2 in. long, ¾–1 in. broad, the lower shorter and broader, the upper longer and somewhat narrower, all rounded or subcordate at the base. Petioles 3 or 4 lines long. Pedic. axillary solitary slender, about 1 in. long. Fl. full lavender-blue with the tube and throat of corona pale or w., large, 1½ in. in diam. Sep. ½ in. long, finely linear, gr. Throat of cor. clothed downwards inside with w. horizontal hairs; angles of corona opposite lobes of cor.-limb. Stam. short halfway down the cor.-tube; anth. large closely connivent over the stigma, hairy outside, bursting inwards. Style slenderly clavate; stigma a viscidly broad-edged or double-edged disk like an up-and-down double-rimmed wheel, with a short conical gr. knob or button in its centre clothed at the tip with a deflexedly stellate or 5-angular thick tuft or *coma* of dense snow-w. silky hairs: the style and stigma together resembling in shape an inverted teetotum. Follicles small slender subulate acuminate unequal 1–2 in. long. Seeds 3 or 4 oblong brown roughened.

Neither the Portuguese *V. media* Hoffm. et Link (*V. major*

Brot. i. 280, nec alior.) nor *V. minor* L. (EB. t. 917) has occurred. *V. rosea* L. (BM. t. 248) is not uncommon in gardens.

The Oleander (*Nerium odorum* Sol.) with more or less deep rose-p. or w., single (BM. t. 2032) or double (BM. t. 1799) fragrant fl., is a common ornament of gardens, to which, however, it is quite confined.

††Order LXI. ASCLEPIADACEÆ.

Cal. and cor. as in *Apocynaceæ*, but lobes of cor. in bud valvate rarely twisted. Stam. 5 inserted at base of cor. and alternate with its lobes, the fil. mostly combined into a coronated tube (*gynostegium*) enclosing the pistil, rarely free; anth. 2-celled or incompletely 4-celled, the connective mostly produced into a membrane at top, connate and applied to the stigma. Pollen coherent into mostly clavate attenuato-stipitate or caudate masses as many as the anth.-cells but mostly 10, the 2 or 4 contiguous pollen-masses of adjacent anthers on escaping from their cells becoming adherent or attached in pairs or quaternately to a common gland or viscid process between each of the 5 lateral angles of the stigma either pendulously, horizontally, or erectly. Styles 2, combined at top by the large fleshy dilated pentangular, variously coronated or appendaged stigma. Ov. 2 with many anatropal ascending or pendulous ovules affixed to the sutural ventral placenta. Follicles 2 or by abortion 1. Seeds numerous mostly comose; alb. thin; cot. leafy; embryo straight; radicle short superior.—Milky acrid poisonous or noxious per. herbs or shr. often twining. L. entire, mostly opposite. Fl. red p. w. or orange-y., very rarely b., extraaxillary, mostly umbellate conspicuous, often fragrant. Stigma deciduous.

††Tribe I. *ASCLEPIADEÆ.*

Fil. connate. Anth. 2-celled. Pollen-masses 10 clavate, varicately pendulous in pairs from the longitudinally sulcate bipartite stigmatic glands or processes.

††1. ARAUJA. Cal. 5-leaved, lobes ovate leafy persistent enlarged after fl. Cor. campanulate, tube broad ventricose or swollen at base, limb 5-partite. Stamen- or anther-crown included subcoroniform 5-leaved, leaflets cucullate erect fleshy adnate downwards to cor.-tube, the margins upwards revolute. Anth. with a terminal membranous point. Stigma 2-horned at top. Pollen-masses compresso-clavate

pendulous attached in pairs to two divaricate or divergent stalks from each stigmatic gland. Follicles spongy-coriaceous; seeds comose.—Climbing or twining partially mealy-grey glabrescent shr. L. w. or pale beneath. Fl. rather large, w. or rose-col., in loose subdichotomous bracteate few-fld. cymes.

††2. GOMPHOCARPUS. Cal. 5-partite, lobes small narrow. Cor. 5-partite rotate, tube very short or 0, lobes petaloidal patent or reflexed. Stam.-crown 5-leaved, leaflets compresso-cucullate with a small outwardly hooked toothlet on each side at top. Anth. with a terminal membranous point. Stigma depressed fleshy 5-angular. Pollen-masses affixed by their attenuated tip, compresso-clavate or cultriform. Follicles inflated ventricose, often clothed or echinate with flexible soft spines. Seeds comose.—Erect or ascending (not twining) shr. or per. herbs. Fl. often specious, in extraaxillary or terminal many-fl. loose cymes or umbels.

††Tribe I. *Asclepiadeæ.*

††1. ARAUJA Brot.

††1. A. SERICIFERA Brot. *Seda* or *Arvore de Seda.*

St. twining; l. ovato-deltoidal acute or acuminate, dull w. beneath, the lower broader shorter and subcordate, the upper narrower elongate and truncate at the base; cymes 1–4- (mostly 2 or 3)-fld., their ped. shorter or not longer than the petioles; sep. erect ovate or ovato-lanceolate, as long as the tube of cor.; lobes of the latter erect plain flat (not undulate) half-ovate subobtuse.—Brot. in Linn. Tr. xii. 69, tt. 4, 5; Spr. Syst. i. 855; DC. viii. 533. *Physianthus albens* Mart. et Zucc. Nov. Gen. i. 53, t. 32 (not Don, Grah., Hook., Lindl.).—Shr. per. Mad. reg. 1, r. Up the Machico valley in several spots quite naturalized, as in the garden-hedge by the roadside at the Quinta de S. Cristovo quite naturalized, from 1826 till very recently; and now at the Capella do Amparo up the Rib. Seco, a branch of the Machico valley. July, Aug.—A copiously milky climbing shr., running thickly over hedges, &c., to a height of 5 or 6 ft. Branches round woody the older sarmentose pale brown smooth, the younger hard gr. glabrescent flexuously twisting and twining, very thin or slender and mealy or velvety-whitish towards the ends. Petioles slender 1–2 in. long and with the ped. pedic. and cal. velvety whitish. L. 2–3½ in. long, 1–2½ broad, shaped like a pointed flat trowel or isosceles triangle, truncate or subcordate at the base; their upper surface at first minutely and inconspicuously subpuberulous, then glabrescent and shining

dark or full gr.; their lower surface permanently clothed with a dull w. lustreless very densely and shortly velvety thin *tomentum* somewhat like those of *Rubus discolor* W. & N. Fl. subdichotomously cymose, 1–4 together, subracemose, on short intraaxillary ped., scentless, about ¾ in. long, somewhat resembling those of *Clematis cordata* Pursh. (BM. t. 1816) but neither cernuous nor with revolute lobes. Sep. leafy pale mealy gr. or purplish distinct loosely erecto-patent ovate or broadly lanceolate, acute, ½ in. long and about half as broad. Cor. campanulate pale dull pink or flesh-col., sometimes full pink, paler or mealy-whitish-blush outside, within fuller or darker rose-purple disposed in interrupted streaks or lines; the lower inflated part of tube hairy and like the 5 large conspicuous cucullate fleshy lobes or lfts. of stam.-crown (which are adnate downwards to the tube itself) pure w. The shortly forcipately 2-horned stigma y. Tube of cor. ½ in. long about half as broad, constricted above the swollen or inflated base about halfway up, smooth, with 5 pale gr. gibbous prominences outside at the base of the inflated part corresponding with the 5 internal fleshy hooded leaflets of the stam.-crown; lobes of cor.-limb erect or erecto-patent flat ovate mostly subobtuse. Follicles very large, 4 or 5 in. long, very widely or horizontally divergent, acuminately ovoidal broadly constricted towards the base, tumid soft or spongy, irregularly ribbed or plaited longitudinally, pale gr., finally yellowish. Seeds numerous dark coffee-brown rough or granulate; *pappus* or *coma* very copious soft silky w.

In foliage there does not seem to be much difference between the present pl. and *A. albens* Don, as figured in BM. t. 3201 and BR. t. 1759, under the wrong name of *Physianthus albens* Mart., which is properly, as referred by DC., a synonym of *A. sericifera* Brot. But besides the decidedly pink cor. in the Mad. pl., its sep. are much larger and longer (i. e. quite as long as or rather longer than the cor.-tube), and the cor.-lobes are suberect and plain or flat, not spreading or waved or reflected at the sides and tips.

††2. Gomphocarpus R. Br.

††1. G. fruticosus (L.). *Arvore de Seda.*

Shr. erect, branches straight virgate furry-puberulous glabrescent; l. linear acuminate, attenuate at base, subsessile, smooth or glabrescent, shining dark gr. above, the margins subrevolute; fl. umbellate, umbels 5- or 6–10-fld. subcernuous shorter than the l., ped. and pedic. hoary-puberulous slender;

hood-like leaflets of stam.-crown truncate, their 2 inner teeth at top minute short straight erect or subincurved; follicles resupinate softly echinate bladdery beaked.—"R. Br. Wern. Soc. i. 38;" BM. t. 1628; Spr. i. 849; WB. iii. 17; DC. viii. 557; Seub. Fl. Az. 35; Griseb. W. I. Fl. 419; Willk. et Lange ii. 669. *Asclepias fruticosa* Linn. Sp. 315; Lam. Dict. i. 283; Desf. i. 211; Pers. i. 276.—Shr. per. Mad. reg. 1, cc; PS. reg. 1, rr. Waste rocky sunny places and beds of ravines all about Funchal and at various other places along the S. coast chiefly; PS. sparingly in the bed of the Rib. da Serra de Fora; "also Campo Debaixo," S^r^ Moniz. May–Nov. chiefly, but at most seasons.—A Willow-like shr. 3–5 ft. high with flexible straight erect slender leafy round gr. or purpurascent branches, finely downy upwards, smooth below. L. opposite crowded 2–4 in. long, 2–6 lines broad, finely attenuate at both ends, without or with only an indistinct short petiole, dark gr. smooth and shining above, paler and with a still paler prominent distinct (at first downy then glabrescent) midrib beneath, erect stiffish. In pl. growing in moist or shady spots, or cult. in English greenhouses, the l. are broader lanceolate membranous loosely spreading or deflexed and attenuate into distinct petioles. Fl. elegant 6–8 or 9 lines in diam. w. in numerous stalked lateral more or less drooping umbels shorter than the l. nearly or quite scentless. Ped. extraaxillary erecto-patent slender about an inch long; pedic. ½–¾ or 1 in. long, very slender often purplish or red. Sep. linear-lanceolate, finely acuminate and downy, 2 or 3 lines long. Lobes of cor. ovate concave, about 4 lines long, 2½ broad, spreading or subreflexed, more or less ciliato-downy or woolly outside at the edges, distinct like pet., connected at the base only by a narrow ring; hooded lfts. of stam.-crown 5, w. or pale greenish, petaloidal, prominent like the cogs of a horizontal wheel, compresso-saccate or cucullate sharply keeled large conspicuous, with a pair of w. approximate hooked teeth at top bending down outwards into the mouth of the lft. like a parrot's upper mandible, and behind these another pair of minute erect or incurved teeth; the whole lft. very pale greenish, w. at top inwards, reddish purple at the base. Stigma depressed or flattened at top obtusely 5-angular. Follicles inflated membranous or bladdery, elliptic-ovoidal, beaked, 2–4 in. long, 1–3 broad, mostly single (one of the 2 ov. in each fl. being usually abortive, and one only, rarely 2 fl. in each umbel fruit-bearing), resupinately ascending or erect from a twist in their strongly deflexed thickened pedic., mostly red or purplish on their upper or exposed side. Seeds very numerous, black or dark coffee-brown. Pappus w. silky very copious. Whole pl. milky.

From the omission of this pl. in Solander's, Fydell's and Von

Buch's Mad. lists which were formed chiefly on Masson's collections, it may be presumed to have been introduced into the island some time between 1778 and 1820. It first occurs as a Mad. pl. in Raddi's "Breve Osserv. sull' Isola di Madera" (Antol. ii. 267, Firenze 1821), under the wrong name of *Cynanchum vincetoxicum* Pers.

Asclepias curassavica L. (Bot. Reg. t. 81), with its brilliant orange-scarlet umbels of fl., occurs in Mad. only in gardens occasionally, in and about Funchal. In the Canaries I met with it abundantly and apparently quite naturalized a mile or two up the Degollada de S. Sebastian in the island of Gomera. In the Cape-Verdes I found it only rarely in or about gardens.

Stephanotis floribunda Brongn. (BM. t. 4058) and *Hoya carnosa* (L.) (BM. t. 788) are also not unfrequent in gardens in Mad.; the former bearing fr. abundantly at a height of about 1000 ft. above the sea, though not usually fructiferous lower down in Funchal.

Order LXII. CONVOLVULACEÆ.

The Convolvulus or Bindweed Family.

Fl. perfect regular. Cal. inferior 5-sepalous (in *Wilsonia* gamosepalous 5-toothed), sep. persistent often unequal mostly imbricate and enlarged in fr. Cor. hypogynous gamopetalous bell- or funnel-shaped 5-lobed 5-plaited, lobes twisted in bud. Stam. 5 opposite the sep., alternate with cor.-lobes, inserted towards the base of cor.-tube. Anth. mostly sagittate finally twisted. Ov. mostly with an annular or cup-shaped hypog. disk (*nectary*) round its base, of either 1 or 2–4 mostly combined rarely distinct cells or carpels, each cell 1–2-ovulate. Style mostly 1 simple or bifid, very rarely 2 styles; stigmas 1 or 2 simple or bilobed. Fr. a 1–4-celled caps., cells or carpels 1–2-seeded; seeds angular rounded at the back, attached by their base to the inner angle of the dissepiments, their shell (*testa*) often villous or pubescent, always hard and black or dark brown; albumen mucilaginous; cot. large leafy corrugate or plicate; radicle incurved inferior.—Herbs or shr. often milky, mostly twining climbing or sarmentose. L. alternate, simple and entire, pedatilobed, or palmate. Inflorescence various, but pedic. always jointed on to ped. Fl. mostly conspicuous purple, p., r., b., w. or y., seldom fragrant. Root sometimes tuberous, edible or with drastic properties, e. g. *Batata edulis* (Thunb.), *B. Jalapa* (L.), *Ipomœa Purga* Wend., *Convolvulus Scammonia* L., &c.

Tribe I. *CONVOLVULEÆ.*

Style 1, rarely (*Cressa*, *Evolvulus* &c.) 2. Carpels united into a single ovary. Caps. single 2–4-lobed, mostly dry rarely subbaccate, indehiscent or dehiscent.

††1. QUAMOCLITIA. Sep. 5 mostly mucronate or aristate. Cor. *tubular hypocrateriform*, tube *narrow-subcylindric* or clavate *elongate*. *Stam. exserted.* Style 1: stigma single globosely capitate 2-lobed. Ov. 4-celled, cells each 1-ovulate.—Twining herbs. Ped. 1- or mostly many-fld.; br. minute or inconspicuous.

†††2. BATATA*. Sep. 5. Cor. tubular-bell-shaped or *campanulate-hypocrateriform*, tube short subcylindric abruptly enlarged above the narrow base. *Stam. included.* Style 1; stigma single globosely capitate 2-lobed granulate. Ov. 4-ovulate 2-celled or partially 4-celled.—Herb. or suffrutescent often twining. L. palmately nerved, often palmatilobate. Ped. 1 or 2–many-fld.; br. small and inconspicuous, often deciduous.

††3. PHARBITIS. Sep. 5. Cor. *campanulate-infundibuliform.* Stam. included. Style 1; stigma single globosely capitate 3-*lobed* coarsely granulate or favoso-cellulate. Ov. 2- or mostly 3- rarely 4-celled, *cells 2-ovulate.*—Twining herbs with large conspicuous fl. Ped. 1 or 2–many-fld. Br. inconspicuous linear.

4. CONVOLVULUS. Sep. 5 subequal. Cor. campanulate-infundibuliform. Stam. included. Style 1; *stigmas 2 divergent filiform linear* or subclavate. Ov. 2-celled, cells 2-ovulate.—Herb. or fruticose often twining. Ped. mostly 1 or 2- rarely many-fld. Br. small inconspicuous, mostly remote from the fl.

5. CALYSTEGIA. Sep. 5 *equal* membranous. Cor. campanulate-infundibuliform. Stam. included. Style 1; stigma forked bipartite, lobes *short* linear or cylindric-oblong, flattened inside. Ov. 1-*celled or partially 2-celled*, the dissepiment not reaching to the top, cells 2-ovulate. Caps. indehiscent 1- or imperfectly 2-celled, 1–4-seeded.—Twining or procumbent herbs. Ped. 1-fld. Br. 2 *large leafy opposite close below and infolding the fl.-bud or cal.*

††Tribe II. *DICHONDREÆ.*

Cal. and cor. 5-partite or 5-lobed, æstivation of sep. subvalvate. Styles 2. Carpels 2 distinct; ov. 2, or 4 binate in pairs,

* *Batatas* in Spanish and Portuguese is merely the plural of *Batata.*

1–2-celled, cells 1–2-ovulate. Caps. 2 distinct, 1–2-celled, 1 or 2–4-seeded.—Small herbaceous creeping or procumbent pl.

††6. DICHONDRA. Cal. 5-partite or sub-5-sepalous. Cor. 5-partite rotate or sub-5-petalous. Ov. 2 distinct 2-ovulate; styles 2 distinct; stigmas capitate or clavate subtrilobed. Caps. 2 (rarely by abortion 1) distinct binate forming a bladdery double globe connected only at the base, each 1-celled indehiscent and 1- or rarely 2-seeded. —Minute cespitose leafy herbs with creeping st., orbicular undivided long-stalked l., and small inconspicuous fl. on short hooked or deflexed axillary 1-fld. ped.

Tribe I. *Convolvuleæ.*

††1. QUAMOCLITIA Tourn., Chois.

††1. Q. COCCINEA (L.).

Glabrescent; l. cordate-acuminate entire repand or angular at the base; ped. loosely many-fld. longer than the petioles; sep. aristate subequal.—*Quamoclit coccinea* Chois. in DC. ix. 335. *Ipomœa coccinea* Linn. Sp. 228; BM. t. 221; Poir. in Lam. Dict. vi. 12; Pers. i. 183; Hort. Kew. (ed. 2) i. 338; Griseb. W. I. Fl. 472. *Convolvulus coccineus* et *C. luteolus* Spr. Syst. i. 599.—Ann. herb. Mad. reg. 1, rrr. Formerly (1826–1832) quite naturalized in Batata-fields below and about the Quinta do Valle, Funchal; but it seems now to have disappeared there altogether. Aug., Sept.—A small delicate short-lived pl., not lasting above a month or two, with light gr. thin flaccid l. and small but pretty tubular salver-shaped bright or.-r. or scarlet fl. St. not more than 12–15 in. long slender or filiform twining. L. about 3 in. long, 2 broad. Fl. about 1 in. long, limb ¾ in. in diam.

Q. pennata (Desr.)=*Q. vulgaris* Chois. in DC.=*Ipomœa Quamoclit* L., BM. t. 244=*Convolv. pennata* Desr. in Lam. Dict.=*C. Quamoclit* Spr. with 1-fld. ped., crimson fl. and remarkable pectinately pinnatipartite foliage, occurs also occasionally in gardens about Funchal.

†††2. BATATA Rumph., Chois.

†††1. B. EDULIS (Thunb.). **Sweet Potato.** *Batata* Mad.; *Batata doce* Lisbon.

Roots tuberiferous; st. prostrate or procumbent trailing sarmentose, not twining; l. heteromorphous simply cordate or cordately or hastately deltoidal, entire, angular, or 3–5–7-lobed, stalked, smooth on both sides; cymes axillary many-fld. stalked, about as long as the l., fl. congested shortly pedicelled; sep. shortly

aristato-acuminate; cor. pale p. or purple.—DC. ix. 338: J. A. Schm. Fl. Verd. 232. *Conv. Batatas* Linn. Amœn. Acad. vi. 121; Pers. i. 178. *C. Batatas* et *C. edulis* Spr. Syst. i. 607. *Ipomœa Batatas* Griseb. W. I. Fl. 468.—Per. herb. Mad. PS., reg. 1, 2, ccc. A universal crop in fields and gardens everywhere about towns and villages. Fl. here and there at different seasons, but chiefly July–Oct.—Two principal varr. or forms may be distinguished, passing indeed into each other, yet sufficiently or even strikingly distinct in their extreme states, viz.:—

α. cordifolia Lowe: *Batata de Demeraiva, B. corriola, B. amarella. B. cor d'Anil* (synonyms or subvarr.); l. light gr. undivided simply cordate or deltoidal and entire, or cordately hastately or cuneately 3–5-angular, more or less shortly acuminate; tubers thickly oblong, ovoidal, or subglobose mostly red or y., flesh y. or or. rarely w.—*Convolv. edulis* Thunb. Fl. Jap. 84; Spr. Syst. i. 607. *C. Batatas* Linn. Sp. 220; Lour. Fl. Coch. i. 107; Ait. H. K. (ed. 2) i. 331. *Ipomœa Batatas* Poir. in Lam. Dict. vi. 14. *Conv. Indicus Orientalis Inhame seu Battatas* &c., Moris. Hist. ii. 11, t. 3. § 1. f. 4. *Sisarum peruvianum sive Batata hispanorum* Ger. Herb. 780.—Introd. about 1845: now cult. everywhere below 2000 ft. in several subvarr. distinguished by the Portuguese.

β. digitata Lowe: *Batata da terra, B. velha, B. a ramo amarello,* or *B. branca* (syn. or subvarr.): l. dark dull lurid purplish or v.-gr., hastato- or cordato-palmatifidly, or palmatisectly 3–5–7-lobed. lobes narrow the middle lobe produced; tubers mostly thinly subcylindric elongate-oblong or fusiform, flesh mostly w. and farinaceous, sometimes or. or y. and pulpy when boiled or roasted.—*Conv. Batatas* Spr. l. c.—This is the old Mad. *Batata*, now almost superseded by the new more productive but much inferior Demeraran *α*, with which it grows often intermixed, an odd pl. here and there.

St. hard stiff often woody or almost suffrutescent downwards, loosely prostrate or decumbent, trailing, neither rooting nor twining in Mad., 2 or 3 ft. long, sparingly branched but numerous and often thickly matted and dark v. or purpurascent. Foliage mostly light gr. but often full or even dark gr. Whole pl. mostly quite smooth, but st. and petioles frequently more or less hairy, sometimes hirsute. L. on long (1–3 in.) petioles, smooth somewhat shining, very variable in shape on the same pl., palmately nerved or veined, simply cordate and entire, or, like ivy-l., repand-angular, or palmately lobed, and cordate hastate cuneate or truncate at the base; 2–4 in. long, 1½–3 broad, sometimes as broad as or broader than long, often purple-veined beneath, the veins palmate 5 or 6 on each side the midrib. Fl. pale-p. or rose-purple, the throat and tube inside dark

full rose-purple, outside and limb pale, handsome but not large, about $1\frac{1}{2}$ in. in diam., closely aggregate in naked erect axillary many-fld. abbreviate dense shortly fork-branched cymes about as long as the l. at the top of the thick stout firm stiff straight erect or ascending angular dichotomously and shortly branched ped. which is as long as or longer than the petiole; pedic. clustered short stout round smooth verruculate 2–3 lines long; br. none or inconspicuous and early caducous. Cal. smooth; sep. subequal oblong keeled, abruptly contracted at top into the short excurrent awn or mucro of the keel. Cor. 1 in. long altogether smooth tubular-campanulate or -infundibuliform, limb but little expanded, $\frac{3}{4}$ in. broad. Fil. and style smooth, of equal length, w., purple at the base, the former, like the inside of cor.-tube quite at the base, hairy, the hairs w. Anth. erect pale yellowish. Stigma an abrupt large double globe, scrotiform, strongly granulate. Ov. pilose upwards with long w. erect hairs, 4-celled 4-seeded. Nectary waxy-yellow 5-crenate or obtusely lobed, shallow cup-shaped, about $1\frac{1}{2}$ mill. high.

I have never met with ripe or perfect seeds or caps. either in Mad., the Canaries or Cape-Verdes. The pedic. fall off at their junction with the ped. together with the fl. shortly after flowering. Grisebach l. c. describes the caps. as 2-celled and seeds "glabrous except a few puberulous lines."

The root-tubers are of various shapes and sizes, sometimes globose or ovoidal but mostly oblong like red or w. kidney potatoes, often elongato-fusiform, rarely knobby, either pale drab-brown or dirty yellowish w. or dull dark purplish red outside. Flesh whilst raw crisp and sweet, when boiled soft, yet in good sorts firm and often mealy, very sweet, of a dull w., y. or orange col. The w.-fleshed old sort var. β (*Batata velha* or *da terra*) is by far the best, being more usually firm dry and mealy, not unlike a boiled chestnut. The new Demerara sort var. α (*B. de Demeraiva*), whether w. or y., is more of the watery consistence of a boiled turnip, like the y.-fleshed var. of the old sort. Both are far better baked than boiled. Eaten incautiously, whether largely or otherwise for several days consecutively, and unmixed with other food, they are found to possess in some degree the laxative or drastic properties of others of their tribe. Still they form a large proportion of the food of all the labouring classes in Mad.

The mode of culture is very simple. It consists in planting

thickly in shallow trenches, on a layer of manure, the long trailing branches or runners (*ramos*) of the pl. The roots of these produce tubers fit for digging up in from 3 or 4 to 10 or 12 months. The best Batatas are produced in a light dry friable and well-drained, not over moist close soil.

The value of the Demerara sort consists in its more abundant yield and speedy production of tubers, allowing 3 or even sometimes 4 crops to be raised in lieu of one of the old sort. Thus on the destruction of the Potato-crops in 1845-6 by the then prevalent disease, its simultaneous accidental introduction from Demerara into the island proved a most providential alleviation to the famine and distress (see Journ. Hort. Soc. i. 177).

I have endeavoured in vain to find any stable characters to separate further the 2 sorts or varr. above distinguished. The l. in the old sort β are smaller darker lurid smoky gr., the st. perhaps more often suffrutescent downwards, and the fl. seem more closely aggregate or clustered in the cymes. The newer Demerara sort α is also on the whole a stouter stronger more robust luxuriant pl. with mostly light or pure full gr. foliage. I have been unable to detect any difference in the st., foliage or fl. corresponding regularly with that of the shape or col. of the root-tubers, in either of the kinds.

The tubers are usually about the size of Potatoes; but I once (May 1861) saw several from Grand Canary weighing 6–7½ lbs. each; and I have heard of one in Mad. at Machico said to have weighed an Arroba (32 lbs.)! after having been left in the ground 2 or 3 years. Nor indeed is this enormous size at all incredible for a pl. allowed to grow several years undisturbed.

††3. PHARBITIS Chois.

††1. P. PURPUREA (L.).

St. elongate twining, retrorsally hispid; l. cordate acute or subacuminate pubescent or glabrescent stalked; ped. 2–3-fld. shorter than the l.; pedic. umbellate hispid upwards, thickened and stiffly cernuous in fr.; sep. thickly hairy almost hirsute at the base, smooth upwards, ovato-lanceolate or lanceolate; cor. large v.-blue, p. or w. with 5 equidistant darker rays or streaks. —*Convolv. purpureus* Linn. Sp. 219; BM. tt. 113, 1005, 1682; Ait. Hort. Kew. (ed. 2) i. 330; Spr. Syst. i. 597. *Ipomœa*

purpurea Poir. in Lam. Dict. vi. 16; Pers. i. 183; Coss. et Germ. 259. *Pharbitis hispida* Chois. in DC. ix. 341; J. A. Schm. Fl. Verd. 233.—Herb. ann. Mad. reg. 1, $\frac{c}{2}$. Waste ground and vineyards all about Funchal; amongst Cactuses (*Opuntia Tuna* L.) along the Caniço road beyond the Louros, &c. At various seasons.—St. slender strongly twining to the height of 4 mostly or 5 but sometimes 10 or 12 ft. Whole pl. adpressedly subhispid-pubescent, the short w. hairs on the st. and petioles deflexed. L. rather dark dull gr. above, paler beneath, thin soft or flaccid, a little shining or glossy, broadly cordate with a short point, 2–4 in. long, a little broader than long, their petioles mostly longer than themselves. Ped. 2–3 in. long; pedic. $\frac{1}{2}$–1 in. long, after flowering thickened upwards and stiffly hooked or deflexed; br. small linear inconspicuous. Sep. 6–8 lines long pale gr., 2 or 3 outer broad, 3 or 2 inner narrow. Cor. 2–$2\frac{1}{2}$ in. in diam., the throat and tube pale or w., altogether smooth inside; the tube about an inch long regularly infundibuliform from the base. Anth. and style not rising out of the throat, pure w. Fil. bearded towards the base with spreading w. curly hairs; style altogether smooth. Stigma capitate depresso-globose 3-lobed coarsely and strongly granulate, not favoso-cellulose as in *P. Learii* Hook. Nectary shallow 5-agonal, notched at the angles, pale y. Ov. smooth shining conico-turbinate 3-celled, each cell 2-ovulate. Caps. cernuous smooth globose, a little higher than broad, 4 or 5 lines in diam., at first pale gr. or whitish, finally pale brown splitting up valvately from the bottom, very fragile, 3-celled, 6-seeded; seeds black subpuberulous or finely rough, a little shining, triangular, the sides flat, the back convex and grooved, 5 millm. long, 3 broad.

Pharbitis Learii Hook. in BM. t. 3928 occurs in gardens at Funchal; and Sr Moniz thinks it will soon become quite naturalized. Roots per. St. at first herbaceous loosely twining or trailing, then after a year or two frutescent woody and climbing to a considerable height up trees &c. L. cordate, the lower and those of the barren shoots often bluntly 3-lobate, all greyish and finely tomentose beneath. Ped. longer than the l. Cymes 3–5-fld. Fl. much larger and brighter v.-purple than in *P. purpurea*. Sep. lanceolate-acuminate hairy-pubescent almost silky. Cor. $3\frac{1}{2}$–4 or even 5 in. in diam., the tube 3 in. long infundibuliform from the base. Stigma snow-w. abruptly depresso-globose or subdiscoidal, curiously areolato-cellulose or coarsely and irregularly honeycombed with hollow cells separated by irregular reticulating sharp intermediate walls crests or ridges; not granulate. Nectary w. shallow irregularly 5-sinuate obtuse crenate. Ov. 3-celled, 6-seeded, 2 seeds in each cell, but ripened only occasionally.

No sp. of IPOMÆA L., Chois. *proper* (artificially and imperfectly defined by its capitate mostly 2-lobed stigma, 2-celled 4-ovulate ov. and 2-celled 4-seeded caps.) is found wild or even naturalized in Mad.: but several occur in gardens—as occasionally, spreading thickly over arbours, walls or trellises, *I. tuberosa* L. (Bot. Reg. t. 768), a large twining shr. with a tuberous root, palmate l. bright y. fl. and very large seeds and caps., and more frequently the lovely *I. rubro-cærulea* Hook. in BM. t. 3297, a tall stout twining ann. pl. with cordate l., and fl. (in Mad. always) of the purest imaginable sky blue, without a tinge of red or purple.

4. CONVOLVULUS L., Chois.

§ 1. St. not twining—*Orthocaulos* Don.

(*a*) Herbaceous; root and st. ann.

††1. C. TRICOLOR L.

Hairy-pubescent or subvillous; st. pale suberect ascending or diffuse, villous upwards; l. sessile oblong-lanceolate or oblong-spathulate pubescent ciliate especially towards the base; ped. 1-fld. 2-bracteate mostly longer than the l. spreading and flexuous in fr.; sep. ovate or oblong-lanceolate hairy or villous; cor. 3 or 4 times the length of sep. b., throat y., tube w.; caps. villous.—Linn. Sp. 225; Lam. Dict. iii. 548; BM. t. 27; Desf. i. 175; Brot. i. 268 (excl. var.); Pers. i. 182; Hort. Kew. (ed. 2) i. 337; Spr. i. 610; DC. ix. 405; Coss. et Germ. i. 259; Gren. et Godr. ii. 502; Willk. et Lange ii. 517. *C. longifolius* &c. Barr. Ic. p. 4. nos. 28, 29, tt. 321, 322. *C. peregrinus cæruleus, folio oblongo* &c. Moris. Hist. ii. 17, t. 4. § 1. f. 4.—Herb. ann. Mad. reg. 1, rr. Vineyards and waste ground about Funchal here and there occasionally; below the Quinta do Valle; along the road to S. Antonio opposite the Q^ta das Maravilhas, &c. May, June.—St. hard stiff subflexuous one or many from the root, pale gr. often straw-colour or whitish, 1–2 ft. long. L. rather dark or full gr., 1–1½ in. long, 4–6 lines broad, often subundulate at the edges, fringed with long w. soft fine hairs. Ped. in fl. about an inch, in fr. 1½ in. long. Br. 2 minute linear, opposite in fl., alternate and subremote in fr. Sep. subcoherent or close-pressed into a pale obovate-oblong or half-obovoidal tube for about ⅔rds upwards from their base, their limb gr. leafy half-ovate spreading ciliate like the l. Cor. 1–2 in. in diam., mostly sky-b. with the mouth w. and throat bright y. in 5 rays; but sometimes (though not observed in Mad.) the b. is changed into dark v., or the whole fl. except the throat becomes pure w. Stam. subequal rising with the stigmas quite out of the throat; anth.-lobes each with 2 longitudinal dark v. streaks in the b. or v.-coloured fl.; fil. smooth y.

Ov. 2-celled 4-ovulate, densely silky-pilose with long erect w. hairs; style nearly or quite smooth; stigmas long filiform divaricate w. Nectary even at the edge, y. with an or. ring at the base. Caps. depresso-globose 1- or 2-celled, each cell 1- or 2-seeded.

§ 2. St. more or less twining—*Strophocaulos* Don.

(*a*) Herbaceous; root and st. ann.

2. C. SICULUS L.

Root ann.; st. prostrate or procumbent rarely slightly or loosely twining pale adpressedly pubescent like the petioles and ped.; l. nearly or quite smooth oblong-ovate acute truncate or subcordate at the base, very shortly stalked; ped. 1-(rarely 2-)fld., 2–4-bracteate at top, slender, not longer than the l., hooked or recurved in fr.; br. leafy conspicuous linear-lanceolate or ligulate acute, close below and as long as the fl.; pedic. very short; fl. nearly sessile small inconspicuous; sep. broadly oval or elliptic, the upper half herbaceous gr. ovate subacuminate conspicuously ciliate, the lower membranous pale or whitish; cor. small inconspicuous pale b. subtubular, style short; caps. smooth cernuous.—Linn. Sp. 223; Lam. Dict. iii. 540; Desf. i. 174; Pers. i. 180; Ait. Hort. Kew. i. 335; Fl. Gr. t. 196; Buch 193. no. 204; Bot. Reg. t. 445; Spr. i. 608; DC. ix. 407; WB. iii. 23; Gren. et Godr. iii. 503; Willk. et Lange ii. 518; Moris. Hist. ii. 36 (excl. icon. App. § 1. t. 7. f. 4); Bocc. Sic. 89. t. 48.—Herb. ann. Mad. reg. 1, 2 (chiefly 1), $\frac{c}{2}$ or c. Waste grassy places by roadsides or amongst fields and vineyards. Sea-cliffs &c. to the E. of Funchal along the Caniço road. S. Gonçallo, Machico above the E. Fort, S. Antº W. of Funchal &c. March-May.—St. several from the crown of the small vertical root spreading all round 6 in.-2 ft. long slender simple elongate trailing and only occasionally when luxuriant twisting or climbing. Foliage bright or full gr. L. $1\frac{1}{2}$–$1\frac{3}{4}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad, smooth. Petioles 2–4 lines long, adpresso-pubescent like the st. Ped. filiform $\frac{3}{4}$–$1\frac{3}{4}$ in. long adpresso-pubescent bearing at top little leafy heads of 1–2 small nearly sessile fls. subtended by 2–4 smooth leafy br. $\frac{1}{2}$–$\frac{3}{4}$ in. long and 1–2 lines broad, almost overtopping them; pedic. very short, scarcely any. Cal. rather large; sep. smooth 3 lines long, $1\frac{1}{2}$–2 broad in the middle, their lower half pale subscarious, upper subcordately ovate fine-pointed gr. ciliate with y. bristly hairs. Cor. 3 lines long scarcely overtopping the sep. but sometimes almost twice as long as cal., small but pretty, delicate pale b. with 5 silky-pubescent stripes outside, the throat inside w. Style $1\frac{1}{2}$ mill. or $\frac{3}{4}$ line long.

The conspicuous leafy br. close below the fl. owing to the

extreme shortness of the pedicel, indicate an approach to *Calystegia*.

The closely allied *C. elongatus* Willd., Bot. Reg. t. 498, WB. iii. 24 (*C. pseudosiculus* Cav. DC. ix. 407), with 2–3-fld. ped. longer than the l., distinctly pedicelled w. fl. and filiform br. remote from the cal., occurs in the Canaries but has not been found in Mad.

(*b*) Herbaceous; root per., st. ann.

3. C. ARVENSIS L. *Corriola.*

St. prostrate or twining, spirally striate and angular; l. shortly stalked sagittate or hastate oblong mostly obtuse and mucronulate, the basal lobes acute; ped. mostly 1–2-fld., 2–1-bracteolate at top, br. minute linear remote from the fl., shorter than the pedic.; sep. oval or broadly obovate very obtuse; cor. p. and w.: caps. smooth 2-celled.—Linn. Sp. 218; Vill. Dauph. ii. 484; Lam. Dict. iii. 540; Desf. i. 172; Fl. Dan. t. 459; EB. t. 312; Brot. i. 267; Pers. i. 177; Ait. Hort. Kew. i. 327; Buch 193. no. 200; Hook. Fl. Sc. i. 73; Sm. E. Fl. i. 284; Spr. i. 603; Koch 569; Seub. Fl. Az. 38; DC. ix. 406; WB. iii. 22; Coss. et Germ. 259; Gren. et Godr. iii. 500; Bab. 224; Willk. et Lange ii. 518. *C. vulgaris minor arvensis* &c. Moris. Hist. ii. 13, tab. 3. § 1. f. 9.—Herb. per. Mad. and PS. reg. 1, 2, cc; not seen in the Desertas. Cornfields, vineyards and waste ground by roadsides &c. almost everywhere, especially near the sea. March–Oct.—Roots w. slender running extensively and penetrating deep into the ground. Whole pl. mostly smooth, but sometimes very pubescent. St. slender wiry angular spirally twisted but only occasionally twining, 6 in.–2 ft. long leafy sparingly branched. Foliage dull gr.; l. 1–1¾ in. long, ½–1 in. broad; petioles 2–5 lines long. Ped. slender about 1 in. long, 1–3-fld. Pedic. 3–4 lines long; br. about 2 lines, both always puberulous. Fl. conspicuous and elegant, ¾–1 in. in diam., sometimes pure w. but mostly more or less, rarely altogether, rose-p. with 5 deeper-coloured rays, slightly fragrant with the smell of bitter almonds. Style of moderate length, fine and slender; stigmas filiform almost as long as the style. "Caps. ovoidal acute smooth. . . . Seeds black scaly" (Gr. et Godr.).

4. C. ALTHÆOIDES L. *Corriola.*

Whole pl. more or less hispid-pubescent, often silky-hoary, sometimes silvery; st. elongate procumbent or diffuse climbing or partly twining; lower l. undivided ovate-oblong or deltoidal sagittato-cordate obtuse irregularly crenate, upper deeply 5–7-pedate or palmate, the middle lobe produced inciso-lobed or

crenate; petioles slender, of lower l. long, of upper short; ped. erect straight slender much longer than the l., 1–2-fld., 2-bracteolate at base of pedic. a little below the fl., br. minute linear-filiform; pedic. distinct moderately long; fl. large conspicuous; sep. elliptic-oblong acute glabrescent; cor. broadly campanulate widely patent purplish p. or rose; stigmas not overtopping the anth.; caps. elliptic-oblong smooth.—Linn. Sp. 222; Lam. Dict. iii. 564; BM. t. 359; Desf. i. 173; Brot. i. 268; Pers. i. 179; Fl. Gr. t. 194; Hort. Kew. (ed. 1) i. 333; Buch 193. no. 203; Spr. i. 591; WB. iii. 24; DC. ix. 409; Gren. et Godr. ii. 501; Willk. et Lange ii. 519. *C. argyreus* DC. Fl. Fr. "Suppl. 423" (a mere extreme silvery-silky state). *C. tenuissimus* Sibth. & Sm. Fl. Gr. t. 195; Spr. i. 591; Koch 569. *C. althæoides η. pedatus* DC. l. c. *Convolvulus betonicæ althææque fol. repens argenteus fl. purp.* Barr. Icon. 312. *C. argenteus Althææ folio* &c., Moris. Hist. ii. 13, tab. 3. § 1. f. 10.

β. virescens; greener and less hispid, l. more broadly and less deeply or distinctly lobed or divided.—*C. althæoides γ. hirsutus* Chois. in DC. l. c. *C. flexuosus* Sol. MSS. and BH. ! Buch ! 193. no. 202. *C. bryoniæfolius* Sims. in BM. t. 943; Willd. Enum. 205; Lam. Dict. Suppl. iii. 464 and 473. *C. hirsutus* Ten. Fl. Nap. i. 60, t. 15.—Mad. everywhere about Funchal &c., up to 1000 ft. March–June. Scarcely more than an early stage of the pl. or as growing under shade or shelter.—Herb. per. Mad., PS., reg. 1, 2, ccc. Sunny banks and rocky ground everywhere chiefly from the sea up to 1000 ft. All along the Caniço road amongst *Cacti* &c. for the first 2 miles out of Funchal; P^ta^ de S. Lourenço at the Piedade &c. March–Sept.—Root w. hard tough slender penetrating deep into the ground. Whole pl. pale dull gr., becoming more or less silvery-grey or hoary as the summer advances or in exposed hot dry sunny places. St. 2–4 ft. long straight or slightly flexuous somewhat hard or wiry round obsoletely striate pubescent, the ends mostly twining. Petioles of lower l. 1–2 in. long, of upper $\frac{1}{2}$–$\frac{1}{4}$ in., all pubescent. L. about 1 in. long and $\frac{1}{2}$–$\frac{3}{4}$ broad, varying from light gr. to silvery-grey or silky-hoary, and from broad and shallow to narrow-linear deeply cut divisions, the upper pedate with the lobes divaricate and the middle one produced. Ped. about 2 in. long; bractlets about 2 lines, very fine and narrow-linear or filiform. Pedic. 2–3 or 4 lines long pubescent like the ped. and petioles, but more densely. Sep. oval-oblong or elliptic 4 lines long, the inner blunt, the outer acute hairy-pubescent. Cor. bright purplish p. or rose of various intensity, the throat darker, 1 in. long, 1$\frac{1}{2}$–2 in. in diam. Stam. and stigmas scarcely rising out of the throat. Anthers dark vinous-purple blackish. Stigmas and upper part of style and fil. crimson, the former divaricate filiform 3–4 mill. long. Ov. style and fil. smooth. Nectary cup-

shaped, even at top but 5-angular, shining waxy v. with an orange band, half the height of ovary. Caps. small scarcely overtopping the sep.

The fl., produced in great profusion and long succession, much resemble those of the Marsh Mallow, *Althæa officinalis* L.; whence doubtless the name *althæoides*.

(*c*) Shrubby, st. woody per.

5. C. Massoni Dietr. *Corriola.*

Branches elongate sarmentose trailing or partly twining, round smooth or only towards the ends whilst young (like the young l. and petioles) adpressedly pubescent, thickly leafy; l. glabrescent stalked ovate-oblong or ovate subacuminate, rounded at the base or sometimes subcordate, about twice as long as broad and 2½ the length of their petioles, presently with the latter quite smooth; cymes axillary solitary stalked scarcely longer than the l., normally simple and 3-fld. but sometimes trichotomously compound and many-fld.: stalks or ped. and pedic. slender erecto-patent, br. inconspicuous deciduous linear or linear-lanceolate and like the pedic. a little hairy or adpressedly pubescent; cal. obconic or obovate subpentangular glabrescent, sep. at top leafy spreading broadly ovato-rhomboidal or deltoidal, subauriculately waved or plicate at the base, the edges finely subciliate; cor. rather small 3 times the length of cal. w. with the plaits or angles red or rose-purple and adpressedly hairy-pubescent; stigmas not overtopping the anth. Caps. smooth ovate.—" Dietr. Gart. Nachtr. ii. 377;" Chois. in DC. ix. 413. *C. suffruticosus* Ait.! Hort. Kew. (ed. 2) i. 331; Bot. Reg. 133, t. 132 (not Desf.). *C. Dryandri* Spr. i. 597. *C. depilis* v. *C. fruticosus* v. *C. rupestris* v. *C. suffruticosus* Sol.! MSS. and BH. *C. rupestris*? Buch! 193. no. 201 (not Pall. & Willd.). *C. solanifolius* Lowe Prim. 22; Novit. 537 or 15.—Shr. per. Mad. reg. 3, rr. Rocks on the right of the Waterfall at the head of the Rib. de S^ta^ Luzia; Curral das Freiras on the short foot-road down to the right of the Voltas; Rib. da Metade; Rib. de S. Jorge; Seixal more plentifully in most of the ravines especially towards S. Vicente. Fl. May, June; fr. July, Aug.—A large thickly leafy shr. with dark glossy gr. foliage, running over other bushes or hanging down rocks in thick masses with long weak flaunting or trailing shoots like a Woodbine (*Lonicera etrusca* Savi or *L. Caprifolium* L.) twisting or twining only here or there. Older branches stout hard woody covered with an even smooth brown bark; the younger striate and subrufescently adpresso-pubescent (like the young l. and petioles) towards the ends. L. crowded 2–3 in. long, 1–1½ broad, rounded or sometimes cordate at the base, sharply acute

or subacuminate. Petioles slender, an inch long; the uppermost or floral, and lowest, half an inch. Cymes produced chiefly on short erect thickly leafy side-branches but also along the long new shoots, 3 or 4 in. long, with the fl. only just overtopping the l. and much resembling those of *C. arvensis* L. Ped. round slender glabrescent, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long; pedic. a little thicker, $\frac{1}{2}$–$\frac{3}{4}$ in. long. Cal. or sep. $\frac{1}{2}$ in. long, their leafy spreading concave upper half $\frac{1}{4}$ in. long and broad at the subauriculately plicate base, closely and distinctly nerved, acute; the lower half closely imbricate forming a pale smooth even hard fleshy subscariose tube. Cor. 1 in. long, about $1\frac{1}{4}$ in diam., w. or faintly tinged with very pale blush-p. or purple, with 5 broad and 5 narrow reddish-lilac or rose-purple streaks outside and the throat y. Stam. as long as the 2 linear divaricate w. stigmas. Fil. and style smooth w. Caps. globosely ovate tipped with the persistent style and nearly concealed by the brown dry membranous or scarious enlarged spreading or partly reflexed sep., 8–10 millim. high, 6–7 in diam., smooth, even, brown.

The young shoots and petioles of l. are sparingly milky; the milk sweet and creamy or nutty in taste. Fl. mostly scentless but sometimes very slightly fragrant.

5. Calystegia R. Br.

††1. C. sepium L.

Smooth strongly twining; roots per. creeping; st. ann. extensively climbing twisted angular; l. repandly or subangularly cordate or sagittate acuminate; ped. 1- (rarely 2-)fld.; br. large cordate very obtuse pale gr. inflated bladdery or submembranous; sep. equal lanceolate; cor. rather large w. rarely blush or rose. —" Br. Prodr. 483;" Chois. in DC. ix. 433 (excl. varr.); Coss. et Germ. 260; Willk. et Lange ii. 519 (excl. varr. β). *Convolv. Sepium* Linn. Sp. 218; Fl. Dan. t. 458; Vill. Dauph. ii. 484; Lam. Dict. iii. 539; Ill. 450, t. 104. f. 1; EB. t. 313; Brot. i. 268; Pers. i. 177; Ait. Hort. Kew. (ed. 2) i. 327 (excl. var. β); Hook. Fl. Sc. i. 74; Sm. E. Fl. i. 284; Spr. i. 603; Koch 568; Seub. Fl. Az. 38 (excl. var.); Gren. et Godr. ii. 500; Bab. 224. *Conv. major albus vulg.* &c. Moris. Hist. ii. 12, tab. 3. § 1. f. 6.—Herb. per. Mad. reg. 2, rrr. Naturalized at the Livramento, an old Quinta a little to the right of the Mount road about halfway up. First found by Capt. Norman in 1866. " Fl. w. in July," S^r Moniz.—St. slender wiry hard tough twining sometimes to a considerable height, gr. Roots w. brittle and difficult to extirpate, running both deep and far horizontally. Foliage copious, rather dark gr. L. dark gr. above, paler beneath, thin or flaccid, cordate-acuminate, the basal lobes angular

subsagittate or obliquely truncate, 1–2 in. long, ¾–1½ broad (in English spec. often 5 in. × 4). Petioles slender 1–1½ in. long. (The following from English spec.)

Ped. 1-fld. round or angular, 1½–2 in. long. Br. 6–8 lines long tumid or inflated and bladdery erect and closely embracing and quite concealing the sep. and base of cor.-tube, broadly cordate, very obtuse in fl., subacute in fr., light gr. with membranous thin purplish edges, persistent and finally in the ripe fr. pale brown and scarious. Sep. lanceolate equal, ½ in. long, 1½–2 lines broad, thin membranous very pale gr. and shining. Cor. pure w. tubular-campanulate, i. e. with the tube longer than usual in proportion to the limb which is distinctly 5-angular with the edges reflexed or revolute and 2–2½ in. in diam., the tube rising an inch at least above the br. and smooth inside. Stam. and style w. not reaching to the throat or shorter than cor.-tube, style longer than the stam., smooth, splitting at the base in fr. into 2 parts; fil. furry or glandular-pubescent, broadly dilated and flattened downwards; anthers and pollen w.; stigmas 2 w. erect and closely parallel but distinct, narrow-oblong and flattened inside or half-clavate, coarsely granulate or scaly. Nectary a thick tumidly 5-angular y. cup. Ov. small smooth and shining pale yellowish mostly abortive. Caps. rarely perfected hard pale brown globosely ovate or ovoidal tipped with the 2-cleft or 2-partite base of the style and completely enclosed in the dry scarious persistent cal.-br., about 4 lines in diam., smooth outside, puberulous within, 1-celled or imperfectly 2-celled downwards, 4-seeded but 1 or 2 only of the seeds perfected and then large ovoidal irregularly angular, about 2 lines in diam., quite smooth and even, dark blackish brown; the rest minute abortive.

2. C. SOLDANELLA (L.).

Succulent smooth not twining; roots per. creeping; st. ann. prostrate or procumbent; l. a little fleshy orbicularly reniform or cordate mostly very obtuse or retuse and entire rarely subacute and repandly angular; ped. 1-fld. as long as or longer than the l. 3–4-angular thickened upwards; br. broadly oval or ovate-oblong, rather shorter than and not quite concealing the cal.; sep. equal ovate-oblong or oval; cor. large rose-p. or purple with 5 pale yellowish plaits or rays.—Chois. in DC. ix. 433; Willk. et Lange ii. 519. *Convolvulus Soldanella* Linn. Sp. 226; Lam. Dict. iii. 549; EB. t. 314; Desf. i. 176; Brot. i. 268; Pers. i. 182; Ait. Hort. Kew. (ed. 2) i. 337; Hook. Fl. Sc. i. 74; Sm. E. Fl. i. 285; Spr. i. 609; Koch 569 (fl. albis); Gren. et Godr. ii. 500; Bab. 225. *Conv. marinus* noster *rotundifolius* nobis, *Brassica marina* Matth., &c., Moris. Hist. ii. 11, t. 3. § 1. f. 2.—Herb. per. PS. reg. 1, cc. Sandy sea-beach and sand-hills close behind it, near the town and to the eastward. May, June.—

Roots and st. slender, creeping or running extensively in the loose sand and forming beds or patches of a dark shining gr. Whole pl. nearly or quite smooth, or with only the st. and petioles a little puberulous. Petioles slender about an inch or not more than an inch and half long. L. 1–1½ in. in diam. orbicular with a wide open notch at bottom and mostly retuse with a shallow smaller one at top, sometimes merely obtuse, palmately 6-nerved, always in PS. with the basal lobes rounded and quite entire, not angularly deltoidal or repandly toothed and acute, as in EB. t. 314. Ped. erect 1½–2 in. long, thickened and membranously 3–4-winged or angular upwards. Br. leafy gr. close beneath the fl. and erectly embracing the cal., broadly obovate or oval obtuse, 4–5 lines long. Sep. about the same length but ovate narrower and more acute, their tips overtopping the br. Cor. funnel-shaped 1 in. long above the br. or sep., a little more in diam., always pale rose-pink in PS. Lobes of stigma short divergent linear-subulate acute.

In habit and foliage this pl. more resembles some entire-leaved aquatic *Ranunculus* or even *Hydrocotyle* than a *Convolvulus*.

The Açorian pl. referred to under this name by Seubert (Fl. Az. 38) proves to be *Batata littoralis* (L.) according to Mr. Watson in Godm. Az. 197.

††Tribe II. *Dichondreæ*.

††6. Dichondra Forst.

††1. D. repens Forst.

St. creeping pubescent; l. fasciculate cordately rounded or reniform, entire but mostly retuse or notched at the apex, minutely and inconspicuously adpresso-puberulous above, almost silky beneath; ped. one-fld. deflexed pubescent; sep. subvillose; pet. or lobes of cor. shorter than the sep.—Forst. Gen. 39. t. 20; Lam. Dict. ii. 277, Suppl. ii. 470, Ill. t. 183; Pers. i. 288; Spr. i. 863; Chois. in DC. ix. 451; Griseb. W. I. Fl. 476. *Sibthorpia evolvulacea* Linn. Suppl. 288. "*Steripha reniformis* Gærtn. ii. 81, t. 94."—Herb. per. Mad. reg. i, rrr. Funchal, in the Rua de S. Pedro, 40 or 50 paces east of the church, running between the stones of the pavement, one small patch. First observed by Sr J. M. Moniz in 1868. March–June.—An almost minute inconspicuous pl. with more the aspect or habit of some *Hydrocotyle*, such as *H. asiatica* L., than of a *Convolvulus*; discernible only by its dark gr. crowded l., forming a cespitose bed or mat between the stones scarcely above an inch high. St. cespitose creeping slender or filiform yet strong and wiry, with the l. and

fl. fasciculate at their rooting nodes and the fl. quite concealed by the crowded l. Whole pl. more or less pubescent or puberulous though appearing smooth or glabrescent. L. above dark dull bottle-gr. subpuncticulate and thinly finely and minutely adpresso-puberulous, but to the naked eye appearing smooth ; beneath a little brighter but scarcely paler gr. and more closely adpresso-puberulous scarcely silky but distinctly palmately 5–7-nerved ; 3–4 lines broad, 2–3 long, the edges very entire but sometimes a little waved or plaited as if crenulate. Petioles slender subpubescent 5 or 6 lines long or more, blanched downwards. Ped. one-fld. ebracteate much stouter and shorter than the petioles, 2 or 3–many from the nodes, abruptly deflexed or hooked downwards in all stages like those of *Trifolium subterraneum* L., pubescent, thickened in fr. Fl. small inconspicuous pale gr. or yellowish w. like the petioles, opening stellately to $\frac{1}{10}$ or $\frac{1}{12}$ in. in diam. Sep. 5 herbaceous gr. permanent half-ovate or ovate-oblong obtuse villoso-pubescent and fringed at the edges. Pet. 5 hypogynous alternate with sep. scarcely united except by the broad subdilated fil. at the base, pale greenish ligulate obtuse. Æstivation of sep. and I think of pet. nearly if not quite valvate, or at least only subimbricate. Stam. 5 hypogynous short half the length of and alternate with the pet. ; anth. large reddish brown bursting longitudinally. Ov. 2 large didymous. Styles 2 very short ; stigmas pale gr. large capitate subtrilobed. Fr. large scrotiform, of 2 geminate distinct globose indehiscent caps., each about 2 mill. in diam. and each mostly 1-celled and 1-seeded, but one of them sometimes apparently double externally with an impressed raphe and 2-seeded though still only 1-celled internally ; and sometimes (but rarely) one of the 2 normal globes is wanting, and again sometimes instead of being distinct and separate down to the base they are connate or confluent and 1-celled without any dissepiment between the 2 seeds. Before maturity the fr. is conspicuously large and w. or cream-coloured ; but when ripe it shrinks a little, becoming pale brown or fawn-colour and of a dry thin brittle chartaceous substance. The cal. becomes a little enlarged and leafy in fr. but not reaching above half its height. Seeds dark brown smooth and even but not polished, hemispherically subovato-globose, rounded-convex dorsally, flat ventrally, quite loose and free in the ripe caps., large $1\frac{1}{2}$ mill. in diam. Cot. large linear-oblong flexuously coiled up like the rad. within the horny albumen.

First observed 100 years ago by Forster, on Capt. Cook's Expedition, in New Zealand, this curious little pl. is now found in almost all the warmer regions of the globe. It is however of very recent (3 or 4 years) introduction into Mad., where never-

theless it will probably become as quickly universal in the streets of Funchal as *Euphorbia prostrata* Ait., *Euxolus deflexus* (L.) and *Alternanthera Achyrantha* (L.).

Order LXIII. CUSCUTACEÆ.

Fl. perfect regular. Cal. inf. gamosepalous 5–4-lobed or -partite, lobes equal subvalvate i. e. very slightly imbricate in bud, not enlarged in fr. Cor. hypogynous gamopetalous globose, urceolate or tubular fleshy persistent marcescent 5–4-fid. or lobed, lobes equal alternate with cor.-lobes subvalvate or very slightly imbricate in bud. Stam. 5–4 adnate to cor.-tube alternate with cor.-lobes, each mostly with a scale at its inner base. Ov. free without any hypogynous disk or cup (nectary) at its base, 2-celled 4-ovulate. Styles 2 distinct, rarely combined; stigmas cylindric-linear, capitate, or clavate. Fr. a single two-celled membranous circumscissilely dehiscent caps., rarely baccate. Seeds 2 in each cell smooth; embryo filiform coiled spirally within the mucilaginous or fleshy albumen; radicle marcescent; cot. 0 !—Leafless presently rootless and parasitical herbs with filiform or capillary twining st., reddish or yellowish, devoid of gr. colour, creeping and twisting over other pl. Fl. minute aggregate w., p., or flesh-colour, mostly agglomerate in sessile crowded globose tufts or heads, sometimes fragrant.

1. CUSCUTA. Char. that of the Order.

1. CUSCUTA L.

Dodder.

§ 1. *Eucuscuta.* Styles and stigmas simple filiform or subclavate, equably continuous, not capitate.

1. C. EPITHYMUM Murr. *Linheio.*

St. finely capillary pale or flavescent rarely rubescent, intricately intertwining, cobwebby or matted: heads of fl. small 2 or 3 lines in diam. globose sessile bracteolate w. rarely pale blush-p. or flesh-coloured; fl. scentless sessile densely crowded small; cal. w. or subrubescent *distinctly shorter than cor.*, lobes *scarcely or not longer than cor.-tube* loose or spreading fleshy nerveless not carinate; cor. shortly campanulate or urceolate w. rarely pale blush or flesh-coloured, tube short cylindric finally subinflated or ventricose, lobes nerveless ecarinate shortly and broadly half-ovate apiculate scarcely or not longer than the tube, spreading or reflexed; stam. exserted, scales at their base large fimbriate convergent or connivent over the ov.; styles distinct

erect and parallel, rarely subdivergent.—Murr. in Linn. Syst. Veg. (ed. 13) 140; EB. 378 (text at bottom of page, not fig.); EBS. t. 2898 at bottom (except the narrow acute interspaces of scales in the middle fig.); Pers. i. 289; Hook. Fl. Sc. i. 86; Sm. E. Fl. ii. 25; Spr. i. 865; Rchb. Iconogr. t. 499; WB. iii. 36; Koch 569; Coss. et Germ. 261; Gren. et Godr. ii. 504; Bab. 225 ?; Willk. et Lange ii. 520. *C. europæa, epithymum* β Linn. Sp. 180; *β. minor* Lam. Dict. ii. 229, Ill. t. 88; b, Vill. Dauph. ii. 311; A, Desf. i. 147. *C. europæa* EB. t. 55. *C. minor* Vaill. Par. 43. nos. 2, 3; DC. ix. 453. "*Epithymum s. Cuscuta minor* Bauh. Pin. 219;" Fl. Dan. t. 427.—Herb. ann. Mad. reg. 1, r; PS. reg. 3, r. Mad., Brazen Head, on *Mercurialis ambigua* L. &c., Ilheo de Fora or do Pharol (P^ta^ de S. Lourenço) on *Calendula maderensis* DC. chiefly (most abundant immediately below the Lighthouse); PS. on *Cheiranthus arbuscula* Lowe on S.W. ascent of Pico Branco; on *Hypericum glandulosum* Ait. on E. side of Pico d'Anna Ferreira (Barão do Castello de Paiva). Feb.–April.—Overspreading and often destroying the pl. or weeds which it infests with a thick tangled filamentous mass or web of a pale straw-colour, rarely subrubescent; the extremely fine capillary branches fulvous or deep golden-y. towards their free produced and loosely flaunting ends, but lower down intricately intertwining amongst themselves in tangled cobwebby masses rather than twisting in distinct coils or rings round the st. or branches of the pl. which they infest. Heads of fl. either sparse and remote or densely massed and crowded, size of a small pea, w. or pale, with a small inconspicuous ovate or ovato-lanceolate membranous br., at first w. then brown, at their base. Fl. rarely 4-merous, perfectly scentless. Cal. little more than half the length of the cor.; tube short, gr. only at the base; lobes without nerve or keel, thick and fleshy, shining w. and pellucidly vesicular-granulate like the cor., elliptic and acute or clavate and obtuse, nearly or quite as long as the cor.-tube, loose or spreading. Cor. pellucid shining w. or pale; tube short, at first cylindric, then urceolate; lobes abruptly and shortly acuminate, scarcely longer than broad, shorter or not longer than the tube. Anth. bright chrome-y., shortly oblong or oval, obtuse or retuse not apiculate, exserted above the cor.-tube or stigmas and reaching half the length of the cor.-lobes; scales at base of their w. fil. spathulate, obtuse or truncate, sometimes subacute, filmy-w. pellucid, glandular-fimbriate or irregularly capitato-ciliolate, connivently inflexed over the ov., distant below with widely arcuately-rounded interspaces, not (as described by Bab. l. c. 225 and figured in EBS. t. 2898) "approximate below with narrow acute spaces," but exactly as figured on the same plate above for *C. trifolii* Bab. Styles filiform-cylindric thickish continuous or confluent with the obtuse or subtruncate not more thickened stigmas, distinct quite to the base, erect

and parallelly approximate, sometimes erecto-divergent, their lower half w., upper or stigmatic half dark red. Ov. large 2-lobed gr.

2. C. CALYCINA Webb.

St. more robust and wiry or less finely capillary and cobwebby than in *C. Epithymum*, less matted or intricately intertwining and more frequently spirally curling or tightly twisting in coils or rings round the branches of the pl. on which it grows, dark red or purple; heads of fl. $2\frac{1}{2}$–$3\frac{1}{2}$ lines in diam. globose sessile bracteolate p. or rose-col.; fl. not quite sessile densely crowded rather large; cal. deep p. or rose-purple *large subconspicuous nearly or quite as long as the cor.* deeply 5-cleft or 5-partite, lobes membranous large *broadly oval or oblong-ovate* subobtuse *reaching nearly to the tips of the cor.-lobes*, not nerved or carinate; cor. blush-p. or flesh-col., the lobes at first erect then spreading or reflexed, otherwise, like the stam. with their scales, as in *C. Epithymum*; styles distinct *divergent from their base.*—WB. iii. 37, t. 142.—Mad. on low bushes of common E. Broom (*Sarothamnus scoparius* (L.), Serra do Estreito, from the late T. H. Edwards Esq. May 16th 1839 and May 1st 1848.—Pl. stouter larger and more rubescent altogether than in *C. Epithymum*; st. thicker or less cobwebby and darker red or purple with (in Mad.) larger thickly crowded heads forming a dense mass of fl. of a beautiful p. or rosy and w. hue like a bunch of fl. of *Tamarix gallica* L. Fl. very fragrant!, in bud deep rose-red or purple, passing as they expand from p. to pale blush or w. Stam. exserted, shorter than cor.-lobes. Styles and stigmas altogether dark crimson or atropurpureous, ultimately longer than the stam. Scales at base of fil. precisely as in *C. Epithymum* above. Seeds 2 only perfected, large globose or subtrigonal with 2 flattened and one convex (dorsal) side, like that of a *Convolvulus*, brown or fawn-colour, finely and closely granulate.

Willkomm and Lange strangely refer *C. calycina* Webb to their *C. planiflora* Ten., which they distinguish from *C. Epithymum* by its carinated cal.- and cor.-lobes and by the latter never being reflexed. The former of these characters applies indeed to *C. Episonchum* WB. iii. 36, t. 141; but neither of them to *C. calycina*.

It may however be well doubted whether either *C. calycina* or *C. Episonchum* Webb is really distinct as a species from the polymorphous *C. Epithymum*.

Order LXIV. SOLANACEÆ.

The Nightshade Family.

Fl. perfect regular mostly 5-merous. Cal. inf. gamosepalous free persistent (at least by its base) and often leafy and enlarged in fr., 5- rarely 4- or 6-toothed, -fid or -partite, valvate or subimbricate in bud. Cor. hypogynous gamopetalous caducous mostly rotate or stellato-rotate, sometimes infundibuliform or hypocrateriform, limb 5- rarely 4- or 6-partite or 5-angular, lobes sometimes a little unequal, *valvate or induplicato-valvate in bud.* Stam. all perfect alternate with and as many as cor.-lobes, inserted on its tube, sometimes unequal; anthers opening by 2 terminal pores or longitudinally, rarely unequal and with the lower produced. Ov. 2-celled, sometimes completely but mostly more or less incompletely 3–5-celled by spurious partial dissepiments; placentas axile; ovules numerous amphitropal. Style 1 simple terminal; stigma capitate or clavate, simple or 2-lobed. Fr. a more or less juicy many-seeded berry (*grape* or *nuculanium*). Seeds numerous compressed and reniform or lenticular with a hard shelly or bony *episperm*, copious fleshy *albumen*, mostly curved or spiral (rarely straight) terete *embryo* and semicylindric cot.; the *radicle* inf. its point directed downwards to the inner basal angle of the seed a little below the *hilum*.—Herbs or shr. rarely tr., with watery poisonous or noxious more or less narcotic juices, often prickly. L. alternate often geminate upwards by the partial development of axillary buds, without true stip., rarely pinnatisect. Inflorescence normally cymose (racemiform, corymbiform, paniculate, spicato-fasciculate or umbellate), cymes often super- or extraaxillary sometimes reduced to 1 or 2 axillary fl. Fl. or their pedic. mostly articulate to ped. or rachis and small, w., p., lilac, v. or purple, rarely fragrant.

A. *Gyrembryoneæ*; embryo annular or spiral.

Tribe I. *SOLANEÆ.*

The Potato and Tomato Tribe.

Cal. small simple very rarely leafy or enlarged in fr. Cor. 5-stellately or 5-angularly rotate. Anth. at first erect and connivent or coherent into a cone or pyramid bursting by terminal pores or longitudinally. Fr. berry-like i. e. a *grape* or *nuculanium*, mostly juicy.—Herbs or shr. often prickly. Fl. in supraaxillary or axillary cymes or rac. rarely reduced to one or two fl.

†††1. CAPSICUM. Cal. small subcyathiform obsoletely 5–6-toothed 5–6-angular, somewhat fleshy scarcely or not at all enlarged in fr., not leafy. Cor. stellato-rotate 5–6-fid, tube very short, limb plicate, lobes acute. Stam. 5–6 subexserted, fil. short flattened-filiform, anth. free connivent, longitudinally dehiscent. Stigma depresso-capitate subbilobed. Ov. 2–4-celled. Fr. inflated nearly dry imperfectly 2–3-celled many-seeded, oblong conoidal ovate ovoidal or globose.—Shr., rarely herbs, unarmed. L. simple entire ovate or lanceolate, attenuate at each end. Fl. small alary in the forks of the st. or extraaxillary, solitary or 2–several together, w., pale yellowish or violascent. Fl. and their pedic. articulate to ped. or st. Fr. polymorphous both in shape and size, scarlet red or y. Whole pl. in drying disarticulating at the forks or axils and not only at the ped. and pedic.

2. SOLANUM. Cal. small not leafy stellately 5-fid or 5-partite, lobes scarcely or not at all leafy or enlarged but mostly dry or marcescent in fr. Cor. stellato-rotate, limb mostly equably 5-fid or 5-partite, lobes distinct plicato- or induplicato-valvate in bud. Stam. 5 inserted in the throat of cor.; fil. short; anth. equal linear subelongate bursting by 2 apical pores. Fr. a 2-celled or imperfectly 4-celled many-seeded naked globose or ovoidal berry-like *grape*, juicy or fleshy, rarely dry. Seeds smooth or naked.—Herbs, shr. or subarb. often prickly. L. mostly simple undivided. Pubescence mostly compound or stellate very rarely viscid. Fl. in extraaxillary lateral or at first terminal corymbiform 1–many-fid. cymes or umbels, mostly w., lilac, blue or v. Fl. or their pedic. articulate to ped. or rachis. Fr. y., or., r. or black.

††3. LYCOPERSICUM. Like *Solanum* but lobes of cal. in fr. herbaceous lax linear, cor. deeply stellato-partite, anth. bursting longitudinally, pyramidally coherent or coadnate at top into a tube with the connective produced into a membranous point and seeds limbate papilloso-puncticulate depressedly silky-pubescent or sericeous towards the limb or border.—Herb. ann. or per. mostly viscid villose, often fetid or strong-smelling pl., with simple (not stellate) hairs or pubescence, odd-pinnatisect or pinnatipartite l., articulate pedic., y. fl. and scarlet red or y. edible juicy pulpy or fleshy fr.: the fl. and fr. sometimes by coalescence or multiplication of parts irregularly 6–many-merous.

4. NORMANIA *. Cal. leafy 5-partite open and enlarged in fr. with erect or erecto-patent herbaceous leafy lobes, not bladdery or contracted at the mouth or inclosing or concealing the berry. Cor. widely rotato-campanulate, limb 5-angular or shortly 5-lobed plicato-valvate (as in *Physalis*). Stam. 5 unequal, scarcely exserted; fil. simple shorter than the anth. dilated and coadnate at the base into a narrow ring; anth. erect distinct free (not connivent) unequal, the lower 2–3 mostly arcuato-elongate and often with a gibbous or spur-like or even short-horn-like lobe inside towards the base, the 2 cells turgid downwards, united laterally nearly to their base and bursting (by a pore at first, then) longitudinally and outwardly all their length. Style simple; stigma subcapitate subbilobed. Fr. berry-like globose 2–1-celled juicy or pulpy many- (about 20-) seeded surrounded by the enlarged leafy more or less loosely spreading or erect cal.-lobes. Seeds as in *Solanum*.—Succulent branched herbs or sometimes sarmentosely suffrutescent, viscid-villose. Lower l. 3–5-pinnatisect, upper simple subentire. Rac. pedunculate subaxillary many-fld. simple or rarely bifid; pedic. secund, drooping in fl., deflexed in fr., not articulate to fl. or rachis. Fl. subconspicuous v.-b. or lilac. Fr. blood-red or scarlet. Strictly Macaronesian (Mad. and Can.) sporadic pl.

Tribe II. *PHYSALIDEÆ*.

The Winter-cherry Tribe.

Cal. leafy and conspicuously enlarged in fr. Cor. 5-angularly subrotato-campanulate. Anth. free distinct short, bursting longitudinally. Fr. entirely enclosed within the vesicular inflated cal. which is contracted at the mouth.—Pubescent often viscose herbs. Fl. axillary solitary rarely 2–3-nate.

††5. PHYSALIS. Cal. 5-toothed or 5-fid leafy, much enlarged inflated and membranous in fr. and closed or contracted at the mouth. Cor. widely subrotato-campanulate, limb 5-angular plicato-valvate in bud. Stam. 5 subincluded, fil. connivent originating from 5 adnate scales at base of cor.; anth. erect short free distinct bursting longitudinally. Fr. berry-like globose juicy 2-celled many-seeded, enclosed completely within the 5-angularly globose capsuliform inflated bladdery reticulated cal. Seeds numerous small compressed reniform; embryo half-annular; cot. semiterete.

* In honorem Francisci M. Norman, Classis Reg. Brit. navarchi, inter indagatores Floræ Mad. optime merentis.

—Ann. or per. herbs rarely suffrut. L. soft, entire or repandly lobed. Fl. ochroleucous; ped. 1-fld. simple exarticulate solitary extraaxillary or in the forks of the branches. Fr. red or y. drooping.

B. *Orthembryoneæ*; embryo straight.

†††Tribe III. *CESTREÆ.*

The Cestrum Tribe.

Cal. small simple equally 5-toothed or lobed, not leafy or enlarged in fr. Cor. hypocrateriform more or less infundibuliform. Anth. short free erect bursting longitudinally. Fr. fleshy berry-like. Seeds mostly few compressed.—Shr. or tree unarmed. L. simple. Fl. mostly small and greenish y., w. or cream-col., sometimes or., red or purple, often fragrant.

†††6. CESTRUM. Cal. short tubular subcyathiform or subcampanulate 5-toothed or 5-fid. Cor. hypocrateriform or tubular-infundibuliform, tube slender filiform or clavate, limb short 5-fid, lobes induplicato-valvate. Stam. 5 included, fil. toothed or simple, anth. globose or obcordate bursting longitudinally. Ov. 2-celled few- or many-ovulate shortly stipitate, with or without an hypogynous disk; stigma capitate or clavate. Fr. "berry-like 2–1-celled few-seeded. Seeds compressed; embryo straight; cot. leafy small orbicular."—Shr. or small tr. often fetid. L. simple entire. Fl. or their pedic. articulated to the rachis small in axillary and terminal cymes or fascicles, mostly yellowish gr. or w., often deliciously fragrant especially at night; edge or margin of cor.-limb pubescent. Fr. "black or b., atropurpureous or v., rarely w."

A. *Gyrembryoneæ.*

Tribe I. *Solaneæ.*

††††1. CAPSICUM L.

§ 1. Fr. erect or suberect, oblong

†††1. C. FRUTESCENS L. **Cayenne or Chili Pepper.** *Pimenta encarnada*; (tr.) *Pimenteira.*

Shr. erect smooth or glabrescent stiffly and subflexuously fork-branched, younger branches gr. hard angular subpuberulous glabrescent; l. single or binate elliptic-ovate or lanceolate acu-

minate unequal at the base and cuneately attenuate into the petiole, smooth entire; cal. in fr. cup- or saucer-shaped, subpentagonal with 5 or more erect remote sharp distinct little teeth or denticles at the angles; fr. erect ovate-oblong or ovato-conoidal obtuse 2-celled, cells equal many-seeded; seeds much flattened, angularly suborbicular, smooth, pale yellowish.—Linn. Sp. i. 271 (excl. var. *β*); Lam. Ill. no. 2395, t. 116. f. 2; Poir. in Lam. Dict. v. 325; Pers. i. 230; Ait. H. K. i. 406; Webb Spicil. 162; J. A. Schm. Fl. Verd. 236; Griseb. W. I. Fl. 436.—Shr. per. Mad. reg. 1, 2, cc. Gardens, vineyards, &c. about Funchal and other places, almost everywhere, subspontaneously. Summer and Aut. chiefly, but at most seasons; at least in fr.—A small shr. 3 or 4 ft. high. Older branches pale ashy-grey. Fl. w. scentless drooping. Anth. lilac or pale v. at first; pollen w. Fr. about 1 in. long, 5 or 6 lines broad, even, smooth, shining, deep blood-red, on stout stiff erect angular ped. which are a little thickened upwards. Cal. in fr. a little rugged smooth shining gr. fleshy.

Several varr. of this or other sp. are also occasionally cult. Amongst the latter is a smooth var. or form of *C. sinense* Jacq., a more delicate smaller shr. than *C. frutescens* L., not above 2 ft. high, with regularly strongly flexuous subhorizontally spreading sharply angular branches and smaller pendulous ovoidal or shortly oblong-ovate orange-y. fr. 4–6 in. long × 3–4 broad obtuse or subacute tipped with the persistent dried-up style; the cal. as in *C. frutescens* L. Also not unfrequently occur one or two of the still smaller-fruited "Bird-peppers" (*C. conoides* Mill. or *C. baccatum* L.), the first with conoidal pointed, the latter with globose fr. the size of a pea, red or orange, called *Pimenta miuda* or in the Cape-Verdes (wrongly) *Malaguéta*, by the Portuguese, the latter name belonging rightly (Hook. and Benth. Fl. Nigrit. 576) to *Amomum Granum-Paradisi* L.

2. SOLANUM L.

§1. *Morella* Dun.—Herb. mostly ann. L. simple entire repandly angular or angularly toothed, smooth or pubescent, dull gr. not stellato-tomentose. Fl. small w. Berries small, size of a pea, i.e. 2 or 3 lines in diam., globose, black, ochraceous, greenish y., or.-red or scarlet. Pubescence furry or glandular-pilose subcompound not distinctly stellate.

†1. S. NIGRUM L. *Erva de S^ta Maria.*

Fetid or sometimes slightly musk-scented erect bushy leafy ann. herbs, with dark dull lurid gr. nearly smooth or naked foliage; st. straight erect or virgate and with the short erecto-patent branches either naked verruculate and denticulately narrow-winged, or simply angular and more or less furry-pubescent; l. shining naked smooth, or thinly and minutely substrigulose and glabrescent, subcuneately ovate or rhomboidal acute undulate, sparingly and irregularly angularly toothed or repandly subentire, with rather long smooth or more or less furry-pubescent petioles; cymes racemoso-umbellate superaxillary, mostly 4–6-fld.; ped. and pedic. slender adpressedly striguloso-pubescent or puberulous, the latter thickened upwards and strongly deflexed in fr.; cor. outside towards the tips of lobes pubescent, twice the length or more of cal. which is a little enlarged fleshy loosely open and spreading or reflexed in fr.; fil. smooth or pubescent; berries drooping black opaque smooth shining.—*S. nigrum* (*vulgatum*) Linn. Sp. 266 excl. varr.; Vill. Dauph. ii. 494 excl. varr.; Poir. in Lam. Dict. iv. 288 excl. varr.; Desf. i. 194 excl. var.; Brot. i. 283; Pers. i. 224 excl. varr.; Dun. Hist. Sol. 152; Ait. Hort. Kew. (ed. 2) i. 399 (*α. vulgatum*); Buch 193. no. 190; Sm. E. Fl. i. 318; WB. iii. 121; Koch 384 excl. varr.; Seub. Fl. Az. 38; Coss. et Germ. 273 (*a. vulgare*); Webb Spic. Gorg. 162; J. A. Schm. Fl. Verd. 237; Dun. in DC. xiii. 50; Gren. et Godr. ii. 543 *a*, excl. varr. *β*, *γ*; Bab. 233 excl. var. *β*; Willk. et Lange ii. 526. *S. vulgare* &c. Moris. iii. 520, § 13. t. 1. f. 1. *S. officinarum* Fl. Dan. t. 460 (opt.).—Herb. ann. Mad. reg. 1–3, ccc; PS. reg. 3, r/2, and Ilheo de Cima at top; ND. r; GD. reg. 2, r; SD. reg. 2, rr. Roadsides, waste ground, in vineyards, gardens &c. a universal weed, at all seasons.

a. glabrum: st. branches and l. nearly or quite smooth, the former stouter thicker verruculate and denticulately narrow-winged; ped. pedic. and cal. adpressedly puberulous; fil. smooth. —One of the commonest weeds in gardens vineyards roadsides and waste ground everywhere chiefly below 2000 ft., but following cultivation up to 5000 ft. All about Funchal, the Mount, S^ta Anna, &c.

β. hebecaulon; st. and branches furry-pubescent simply angular, l. substrigulose the lower sometimes furry-pubescent, ped. pedic. cal. and fil. striguloso-pubescent.—*S. nigrum* Koch l. c.— With *a* here and there, but rare; Levada de S^ta Luzia above Funchal, Feb.

A low bushy pl. 6–12 in. (rarely more) high with a rank heavy smell and peculiarly dark lurid blackish foliage. Root

strong vertical clothed with fibres. St. firm hard stiff almost woody and round at the base, mostly very erect and straight or very stiffly fork-branched from the base or often only above the middle, forming a compact leafy oblong or subpyramidal bushy head; the branches blackish purple, strongly angular, either naked and verruculate with the angles toothed, or furry-pubescent. L. mostly smooth or naked, 1–2 in. long, ¾–1¼ broad, on petioles ½–1 in. long, thin or membranous, lurid blackish gr. shortly ovate always pointed or acute, cuneately decurrent down the petiole, mostly toothed more or less. Ped. of cymes halfway at least between the axils, about half an inch long rounded; pedic. 5 or 6 lines long more numerous than in either of the 2 following sp. abruptly deflexed in fr. Lobes of cal. short obtuse, spathulate in fl., broadly rounded in fr. Cor. w. tinged or streaked outside especially in bud with p. or lilac; the eye or centre y. radiating up the stellately spreading or reflexed acute lobes. Stigma abruptly globoso-capitate gr. just overtopping the anther-cone. Anth. bright chrome-y. large oblong 2-pored at top. Berries not showing the seeds within, uniformly black, 2–3 lines in diam., reputed poisonous but not ill-flavoured, less acid than in *S. villosum* L. and without the peculiar rank raw taste of those of *Lycopersicum vulgare*. The juice is deep mulberry-col. Seeds flat minutely punctato-reticulate. Cal. in fr. a little enlarged, lobes blunt fleshy sometimes reflexed.

Nothing can be more variable than the l. in amount of dentation; but the teeth are almost always acute more or less, and the l. cannot properly be described as sinuato-dentate.

The bruised or pounded fresh l. are a favourite rustic remedy as a cataplasm for boils or tumours.

S. nigrum EB. t. 566 represents a luxuriantly succulent spreading and widely branched state of the pl., with thick juicy strongly winged st. or branches, shortly stalked entire repandly waved subcordate l. and larger berries, occurring in Mad. occasionally in moist or shady spots.

2. S. PATENS Lowe.

Inodorous naked nearly altogether smooth or glabrescent shining bright gr. diffusely but stiffly spreading (not erect or bushy) ann. suffrutescent; branches forked subelongate remote stout stiff hard or almost woody, horizontally straggling or divaricately spreading, light gr., straw-col. or pale brown downwards, smooth and naked or glabrescent, 2-edged, denticulately winged; l. shining glabrescent nearly or quite smooth ovate- or elliptic-oblong acute or acuminate, wedge-shaped more or less

attenuately at the base and broadly decurrent down the petiole, subundulate repandly angular or sparingly and irregularly but sharply and strongly toothed; cymes small and inconspicuous, far superaxillary shortly pedunculate racemoso-umbellate 2–5-mostly 3-fld.; pedic. nearly as long as ped. reflexed or drooping from first to last, both (like the sep. and young l.) substriguloso-puberulous; berries drooping dull reddish orange or miniaceous, (in earlier stages pale yellowish or dull watery ochre-y.) pellucid smooth shining.—*S. humile* WB. iii. 122? (not Bernh.). —Herb. suffrutescent ann. Mad. reg. 2 (upper part) or 3 (lower part), rr. Rib. de S^{ta} Luzia, from about half a mile below to the foot of the waterfall itself, in the bed of the ravine on the W. side of it; "S. Vicente at the Forno de Cal, Seixal, Serra' do Fayal (Levada da Fajãa dos Vinhaticos) and Rib. do Vasco Gil" near Funchal, S^{r} Moniz. At various seasons i. e. March–Dec.—Very distinct from every state of *S. nigrum* or *villosum* by its larger size robust straggling rankly growing habit, flaunting elongated branches, glossy bright gr. foliage and large sharply toothed and pointed l. Whole pl. scentless. Branches 2 ft. long or more, decumbent or diffuse quite smooth or glabrescent strongly denticulately winged compressed or 2-edged and warted, the warts scattered and often tipped with a short incurved w. hair or bristle. Petioles $\frac{1}{2}$–1 in. long; l. 2–3$\frac{1}{2}$ in. long, half as broad, thin flaccid membranous, the younger only sparingly and minutely substriguloso-puberulous, sharply and strongly toothed at or below the middle and always acute or shortly acuminate. Ped. very short $\frac{1}{4}$–$\frac{1}{2}$ in. long, placed nearly at the top of the internodes or at least mostly nearer to the next above than to their own proper axil, mostly 3–, rarely 4–7-fld. Pedic. very little if at all shorter than the ped., round and rough like the ped. to which they are articulated, drooping or refracted even in the bud and fl., not all originating from the same point. Sep. herbaceous gr. short obtuse without membranous edges, patent or subreflexed in fr.; tube adpressed dark v. Cor. rather smaller than in *S. nigrum* or *S. villosum*, bright w. or yellowish w. with a very distinct narrow v.-purple line up each pet., quite scentless. Berries perfectly globose dull reddish or. or red-lead col., perhaps a little duller than in *S. villosum*, and sometimes (immature?) pale yellowish or dull watery ochre-y., subpellucid, showing the seeds inside, very juicy, subacid and with the nauseous raw taste of Tomatos (*Lycopersicum esculentum* or *cerasiforme*). Seeds yellowish w. reticulato-punctate flat as in *S. nigrum*.

Raised in England (Northamptonshire) in 1860 by my friend the Rev. M. J. Berkeley from Mad. seeds, this pl. preserved all its characters, from which it never deviates in Mad.

The only pl. I can find in the great English Herbaria at all like this is a spec. in BH. marked "*S. patulum*" with an old ticket inscribed "*S. nigrum*—an distincta sp.? Mill. Dict. no. 4 —e seminibus ægyptiacis a Forskâlio missis—annuum, baccæ rubræ Miller;" and with "Hort. Chelsea 1763" written at the back. Yet, whatever this may be, the Mad. pl. can neither be referred to *S. Dillenii* Schult. (=*S. nigrum* patulum* Pers. = *S. procerius patulum* &c. Dillen. Elth. 367, t. 275. f. 355) which has the "st. and branches round, the pedic. erecto-patent in fr. and berries black" (Dun. in DC. xiii. 47 and Willk. et Lange ii. 527), nor to the obscure *S. rubrum* Mill. Dict. no. 4 (Dun. in DC. l. c. p. 57), the typical spec. of which is also extant in BH., and which, though referred by Grisebach (W. I. Fl. 437) to *S. nodiflorum* Jacq., seems to me rather the smooth state or var. β (*S. miniatum* Bernh.) of *S. villosum* Lam. It approaches also *S. humile* Bernh., but differs in its large robust suffrutescent habit and woody elongate rampant straggling smooth or nearly smooth wide-spreading branches, &c.

Though so much larger and stouter a pl. than *S. nigrum*, the fl. are much smaller and so is usually the fr.

†3. S. VILLOSUM Lam.

Musk-scented mostly erect, pale dull gr. more or less greyish-hoary or glaucescent, subdichotomously and remotely branched; branches stout stiff erecto-patent angular or sometimes subdenticulately winged upwards (rarely terete) furry-strigulose or villoso-pubescent at least upwards; l. with rather long winged villoso-pubescent petioles, thickish more or less strigulosо-pubescent or even velvety and hoary, rarely smooth, rounded or rounded-oval, abruptly cuneate or subtruncate at the base, coarsely sinuato-toothed or lobed subremotely but subequably all round, teeth or lobes few short broad mostly obtuse or rounded; cymes superaxillary pedunculate 2–5- mostly 3- or 4-fld. racemoso-umbellate; pedic. pubescent, deflexed in fr.; sep. spathulate fleshy and reflexed in fr.; lobes of cor. outside towards the tips and fil. velvety-strigulose; berries drooping dull watery orange-red or scarlet subpellucid shining, nearly or quite smooth mostly globose. *S. villosum* and *S. miniatum* Auct.—Herb. ann. Mad. reg. 1, 2, c; not seen in PS. or the Desertas. Varr.:—

a. velutina Lowe; young shoots villous, l. furry-tomentose or velvety-pubescent thickish hoary-grey.—*S. villosum* Lam. Ill.

no. 2338; Poir. in Lam. Dict. iv. 289; Brot. i. 283; Willd. Enum. 236; Dun. Hist. Sol. 157; Spr. i. 680; Koch 583; WB. iii. 122; Dun. in DC. xiii. 58; Willk. et Lange ii. 527. *S. nigrum* var. c Vill. Dauph. ii. 494. *S. nigrum* γ. *villosum* Linn. Sp. 266; β. *villosum* Ait. H. K. i. 399; **villosum* (*moschatum*) Pers. i. 224; β. *villosum* Coss. et Germ. 274. *S. miniatum* β et γ Dun. in DC. xiii. 56? *S. annuum hirsutius, baccis luteis* Moris. Hist. iii. 520. no. 3; Dillen. Eltham. 366, t. 274. f. 353.—On the sides of walls, in dry waste ground by roadsides, and an occasional weed in gardens. About Funchal to the westward, at the Valle, the Mount in Mr. Gordon's kitchen-garden, &c. At most seasons but chiefly in summer and aut.—A stout upright pl. stiffly and sparingly fork-branched erectly mostly from the base, not bushy or leafy, with more or less hoary or dull gr. foliage, the st. sometimes simple and branched only at the top, 1–2 ft. high; the branches stiffly ascending or erecto-patent sometimes diffuse or reclinate, hard stout remote dark lurid v., strongly angular and often narrowly denticulately winged as in *S. nigrum*, mostly furry downwards and almost villous towards the ends. Petioles ½–1½ in. long purple or v. winged, villoso-pubescent. L. subfasciculate from the early development of their axillary buds, 1–2 in. in diam., roundish or as broad as long, whilst young more ovate and pointed, all notwithstanding their decurrency down the petiole abrupt and transversely truncate at the base, flat or but slightly waved, rather thick in substance, pubescent on both sides, often hoary especially in summer, but always of a paler less lurid or blackish gr. than in *S. nigrum*; the veins beneath large distinct and prominent and purplish or v.; the margins broadly and regularly sinuate all round, the lobes or sinuses broad and rounded, mostly 7, sometimes 8–10, the middle lobe obtuse and not more prominent than the rest. Fl. drooping rather small, the size of those of *S. nigrum*. Ped. mostly far supraaxillary or a little below the axil (though on the opposite side the st.) of the l. above that to which they belong, villous straight round, not more than ½ in. long. Pedic. round pubescent 5 lines long, not all originating from the same point and hence racemoso-umbellate, abruptly deflexed in fr. Fl. mostly fewer than in *S. nigrum*, 2–5, mostly 3 or 4. Sep. villous v. or purplish, appearing before the cor. falls, spathulate and very obtuse from the paleness of their membranous margins; in fr. strongly reflexed and somewhat fleshy. Cor. similar in size and all respects to that of *S. nigrum*, w. or purplish with the midrib of each pet. y. towards the centre and v. or purple towards the tips. Berries dull reddish or. or red-lead col. (that of the fr. of *Lycopersicum cerasiforme* Dun.), showing the seeds within, smooth or with only a short hair here and there, always as far as I have seen in numerous both living and herb. spec. perfectly globose, rather larger than those of *S.*

nigrum, subacid and not more nauseous than raw tomatos, very juicy. Seeds yellowish w. much thicker or more convex than in *S. nigrum* but otherwise like them in shape and delicate reticulate punctation.

The whole pl. always exhales a faint musky odour. It varies much in degree of villosity or hoariness from season, soil or situation, passing gradually into

β. *lævigata* Lowe; l. subglabrous membranous dull or dark full gr. not hoary but sometimes glaucescent.—*S. miniatum* Bernh. "Begriff. Pflanz. 55, 65" (Koch); Willd. Enum. 236; Poir. Suppl. iii. 759; Dun. Hist. Sol. 156; Koch 583; WB.! iii. 121; Dun. in DC. xiii. 56; Willk. et Lange ii. 527. *S. villosum* Wats.! in Godm. Nat. Hist. of Azores 198 (from Flores spec. in HH.). *S. nigrum* b var. Vill. Dauph. ii. 494. *S. nigrum* α, subv. *miniatum* Coss. et Germ. 274; γ. *miniatum* Gren. et Godr. ii. 543; β. Bab. 233. *S. rubrum* Mill.! Dict. no. 4 (in Herb. Banks.); Poir. in Lam. Dict. iv. 293 (partly); Dun. Hist. 155; Dun. in DC. xiii. 57. *Solanum baccis rubris phœniceisve* &c. Moris. Hist. iii. 520. no. 2.—At higher or in moister situations and in winter chiefly or early spring, only occasionally in Mad. Also (Jan. 1865) at Lisbon in waste ground about the Museum, Buenos Ayres.—A mere local state or temporary condition of α, the distinctions drawn by authors between the two all breaking down in practice. Thus I find usually the branches of α in Mad. denticulately narrow-winged or at least strongly angular; a character ascribed distinctively by authors to *S. miniatum* Bernh. But the late Dr. C. Lemann in litt. July 23, 1838, says, "the Mad. pl. has not winged branches;" and he refers it on this account and from its l. being "in a young state at least villous" to *S. villosum* Lam. instead of (as I had done) to *S. miniatum* Bernh. The berries vary considerably in Mad. in intensity of colour, and are not at all unlikely to become permanently quite pale or even y. ("luteæ" Dillen., Moris., Bernh., Koch ll. cc.) in the colder or moister climates of England, France or Germany; as, parallelly, in the case of *S. auriculatum* Ait. introduced from Brazil to Mad. It is however certain that neither the size, the ovoidal or globose shape or col. of the berries, nor the less or greater smoothness of the l. nor the winged or terete character of the branches appear in very numerous spec. in BH. and HH. to afford any reliable or constant distinctions between *S. miniatum* and *S. villosum* Auct. And thus also in Mad. we have the denticulately winged branches and or.-red or scarlet berries of *S. miniatum* Auct. combined with the hirsute branches and velvety-tomentose l. of *S. villosum* Lam.; and again sometimes (Lemann) the round unwinged branches and villous or velvety-

pubescent l. of *S. villosum* Auct. joined with the red or miniaceous globose berries of *S. miniatum*.

§ 2. *Cerasocarpum* Lowe. Shr. or suffrut. with slender virgate twiggy branches. L. narrow lanceolate or ovato-lanceolate entire repand or undulate smooth or glabrescent. Cymes or rac. often subsessile and reduced to 1–3 or 4 aggregate pedicels. Fl. small w. Berries rarely more than 1 or 2 together globose size of a cherry or 5 or 6 lines in diam., or., red or y.

†4. S. PSEUDOCAPSICUM L. *Pimenteira brava* or *Erva de Sta Maria; Berradura* at Fajãa d'Ovelha.

Suffruticose altogether smooth and scentless, branches slender round gr. leafy; l. lanceolate with the edges waved or repand; cymes shortly pedunculate 1–3-fld., fl. drooping umbellate, fr. erect mostly solitary.—Linn. Sp. 263; Lam. Ill. no. 2311, Dict. iv. 280; Brot. i. 283; Pers. i. 223; Ait. Hort. Kew. (ed. 2) i. 396; Dun. Hist. Sol. 150; Buch 193. no. 189; Spr. i. 684; WB. iii. 122; Seub. Fl. Az. 38; Dun. in DC. xiii. 152; Wats. in Godm. Nat. Hist. of Az. 198. *Amomum Plinii* Ger. Herb. (ed. 1) 289. *S. fruticosum bacciferum* Moris. Hist. iii. 525.—Herb. ann. Mad. reg. 2, cc. Roadsides, rocky stony banks and shady spots in chestnut woods, but nowhere remote from cultivated ground or cottages; at the Mount, S. Martinho (1st ravine to the westward), Calheta, Fajãa d'Ovelha, &c. At all seasons.—An elegant little willow-like shr. 2–3 ft. high, in its slender graceful virgate branches and narrow-lanceolate l. reminding one of *Salix*. Branches simple subelongate thickly leafy remotely subdivided at acute angles, dark gr. upwards, ash-coloured below. L. dark full gr. paler beneath with prominent midrib and side-nerves, membranous not deciduous, 2–4 in. long, $\frac{1}{4}$–$\frac{3}{4}$ broad, attenuate at both ends shortly petiolate, their margins finely waved or repand, not sinuate. Ped. far supraaxillary very short erecto-patent, the lower 1 or 2-, the upper mostly 3-fld. Pedic. drooping in fl., erect in fr., 2–4 lines long. Fl. w. larger than in *S. nigrum* L., subconspicuous. Anth. bright or. large oblong equal. Base of cal. pentagonal, lobes linear-lanceolate not reflexed. Berry opake bright reddish or. or red-lead colour (not y.) smooth and shining perfectly globose, 5 or 6 lines in diam., erect hard or firm, somewhat juicy and insipid rather than distinctly nauseous, never eaten. Seeds rather large roundish flattened waved shining yellowish or dirty w., very obscurely reticulato-punctate.

Though found in Mad. by Sloane as early as 1687, and recorded, on his authority, by Morison l. c. in 1699 as growing there spontaneously, this pl. is probably of S. American origin.

The fresh bruised l. are applied by the country-people frequently to boils or tumours.

The small-fruited var. *microcarpum* Pers. l. c. (*S. microcarpum* Vahl; Dun. Hist. 149, DC. xiii. 153) collected in Tenerife by Bourgeau (not Webb), has not occurred in Mad. The fr. is said to be little larger than a pepper corn. In the Mad. pl. it is about the size of a small cherry.

§ 3. *Astrochlæna* Lowe. Shr. or subarborescent. L. simple large entire clothed like the young shoots and fl.-buds with stellate pubescence mostly floccoso- or furfuraceo-tomentose. Fl. middle-sized v.-blue lilac or w. Berries mostly the size of a cherry (rarely of a pea) 5 or 6 lines in diam. mostly globose rarely ovate, greenish y. or ochraceous, sometimes miniaceous, rarely black or w.

††5. S. AURICULATUM Ait.

Subarborescent erect stragglingly fork-branched stellato-tomentose; l. large elliptic or ovate-oblong acuminate attenuate at the base into the petiole floccoso-woolly glabrescent, petioles pseudo-stipulate at the base in the young shoots by the development of axillary auriculiform ultimately abortive or evanescent and caducous l.; cymes stalked 2–3-chotomous at first terminal congested, presently lateral spreading broad ample; fl. and fr. subsessile on short thick pedicels or shortly pedicelled, erect; fl. v.-blue; berries at first floccoso-furfuraceous, finally glabrescent dull ochraceous or miniaceous globose 4–6 lines in diam.—Ait. Hort. Kew. i. (ed 1) 249, (ed. 2) 396; Lam. Ill. no. 2307, Dict. iv. 270; Pers. i. 221; Dun. Hist. Sol. 166; Spr. i. 682; DC. xiii. 1. 115.—Subarb. per. Mad. reg. 1, r. Here and there in vineyards and gardens above Funchal chiefly along the Levada de S^{ta} Luzia below the Palmeira growing spontaneously; perfectly naturalized on the sea-cliffs about a mile out of Funchal to the eastward beyond the 1st ravine of the Louros or Lazaretto. Fl. and fr. at all seasons.—A somewhat stragglingly or remotely and flauntingly subdichotomously branched small tr. or shr. 6–12 ft. high, the st. 2–3 in. in diam., branches as thick as the little finger, somewhat brittle, leafy w. and woolly upwards, velvety and dull olive-gr. downwards, naked woody and pale ash-col. like the st. below. Foliage large and handsome somewhat dull but not distinctly hoary gr. Petioles 1–2 in. long. L. 6–18 in. long, 3–6 in. wide, thickish and softly velvety, very flaccid and fast withering, dull greyish-gr., thinly stellato-velvety or subglabrescent and minutely (through the lens) shagreened or pustulate above, distinctly paler or whilst young whitish and densely stellato-tomentose beneath;

the edges quite even and entire. Young shoots, petioles, ped., pedic. and cal. more loosely furry tomentose. Petioles stout apparently auriculato-stipulate at their base by the development of two oval or rounded wavy small evanescent and presently caducous l. from their axillary buds, which prove themselves however to be ultimately quite abortive, drying up and withering away. Ped. of cymes stout erect 3 or 4 in. long. Cymes at first densely compact subhemispherical, then spreading fastigiate dichotomously branched, branches short thick ending in short rac. of handsome subsessile full v.-blue scentless fl. 8–10 lines in diam. Cal. densely woolly and w. like the branches and short thick pedic., lobes elliptic-ovate. Cor. stellato-pubescent and hoary outside, lobes broadly ovate-acute spreading or subreflexed, each with a w. streak or ray at its base forming a 5-rayed star in the fl. Anth. oblong bright chrome-y. Style filiform, stigma gr. Berries the size of a small marble or cherry, always stiffly erect, whilst young floccoso-tomentose, finally glabrescent and in Mad. always of a pale dull watery (sometimes greenish) ochre-y., very juicy and much devoured by birds. Hence its rapid diffusion since 1833, when it was first raised by myself from dried berries (*of a full bright red-lead colour*!) received from Rio de Janeiro, though the sp. is said to be originally from Madagascar and the Mauritius.

§ 4. *Sodomela* Lowe. Shr. or suffrutescent more or less spinose. Pubescence stellate. L. repandly sinuate or sinuato-pinnatifid. Cymes or rac. few-fld. Fl. middle-sized (as in *S. tuberosum* L.) v.-blue or lilac. Berries globose pyriform or ovoidal, size of a small apple, crab or wallnut, ½–1 in. in diam., dry, with a hard tough coriaceous skin or rind, y. or or.

†6. S. SODOMEUM L.

Suffruticose leafy full or dark shining gr. spinose; branches hard woody round, whilst young shining as if varnished and dark purplish or blackish above; l. sinuato-pinnati-lobate with broad dilated rounded often 3-lobed lobes and wide rounded sinuses sparsely y.-spinose on both sides, smooth or glabrescent and shining above, thinly stellato-puberulous beneath, ciliato-pubescent at the edges; ped. supraaxillary short 2–6- (often 2-)fld., fl. racemose v.-blue or lilac the lowest remote; pedic. exarticulate erect; fr. drooping hard globose about 1 in. in diam. pale y.—Linn. Sp. 268; Lam. Ill. no. 2358, t. 115. f. 1; Poir. in Lam. Dict. iv. 298; Brot. i. 283; Pers. i. 227; Ait. Hort. Kew. (ed. 2) i. 403; Fl. Gr. t. 235 (fl. rose-lilac!); Spr. i. 688; Gren. et Godr. ii. 544; Willk. et Lange ii. 524. *S. Sodomæum* *a* et *β* Dun. in DC. xiii. 1. 366. *S. Hermanni* Dun.

Hist. Sol. 212, t. 2, B (fr.); ejusd. Syn. 39. *S. pomiferum foliis Quercûs utrinque spinosis, flore Borraginis* Moris. Hist. iii. 521, § 13. t. 1. f. 15.—Shr. per. Mad. reg. 1, ♀. Roadsides, waste ground, especially at the back of the beach towards Fort S^{t} Iago, and about ruined walls or houses in and near Funchal but scarcely above the Levada de S^{ta} Luzia. At most seasons but chiefly July–Dec.—A low erect bushy leafy shr. 1–3 ft. high, with mostly straggling or diffusely spreading or ascending somewhat flexuous stiff and rigid rounded, whilst young shining full dark gr. or purplish-v., when old pale ash-coloured branches, and copious spinose oak-leaf-like full or dark gr. shining handsome foliage. All parts of the pl. spinose; spines straight dilated and compressed at the base, yellowish or pale fawn-coloured; those on the l. scattered and much longer than those of the st., petioles and cal. Petioles short 2 or 3–9 lines long. L. 2–4 in. long, 1½–3 broad, with broad widely rounded entire sinuses and remote bluntly 3-lobed lobes; sprinkled thinly with stellate hairs (like the young shoots, petioles, ped., pedic. and cal.) whilst young, presently glabrescent. Ped. ½–1 in. long, mostly 2–5-fld., with a separate single longer-pedicelled fructiferous fl. at its base, the rest mostly non-productive; ped. erecto-patent, pedic. reflexed, the latter in the fr.-bearing fl. with the cal. closely spinose, in the barren nearly or quite unarmed, all stellato-furfuraceous. Fl. about 9 lines in diam. fine v.-blue or lilac. Cal. small, in the fr.-bearing fl. thickly, in the upper barren fl. sparingly or not at all spinose; lobes ovato-lanceolate. Cor. plicate, stellato-patent, lobes outside stellato-pubescent. Anth. equal oblong full bright chrome-y. Fr. drooping large conspicuous, the size of a crab-apple or rose-apple, whilst immature dark gr. marbled or mottled at top with diffused milky blotches, streaks or veins; when ripe lemon- passing into chrome-y., subunilocular juiceless and dry within and bitter-tasted; whence supposed to be those apples of the Dead Sea, fair to the eye, but filled with only dust and bitterness*; skin smooth shining coriaceous not fleshy; seeds compressed, oval-oblong 3–4 mill. long 2–3 broad, shining pale or dark coffee-brown or tawny, finely reticulato-granulate or shagreened, very narrowly limbate.—The tempting-looking fr. is often infested with *larvæ*, eating out all its contents and leaving only literally "dust and ashes" under its persistent golden fair outside.

* "The fruitage fair to sight like that which grew
Near that bituminous lake where Sodom flam'd."
MILT. PAR. LOST, x. vv. 561, 562.

§ 5. *Tuberarium* Dun. Herb. succulent rarely frutescent, unarmed. Pubescence subsimple. L. pinnatisect. Cymes many-fld. Fl. middle-sized, v.-blue, w. or lilac. Berries globose, size of a cherry, fleshy or succulent yellowish gr. or y.

†††7. S. TUBEROSUM L. **Potatoes.** *Semilhas* Mad. and Cape Verdes; *Batatas* Lisbon; *Papas* Canary Islands.

Root-fibres tuberiferous; st. herbaceous succulent branched leafy erect or ascending strongly angular and denticulately winged; l. odd-pinnatisect, lfts. oblong-ovate entire veiny-rugose substrigulosely pubescent, dull or dark gr. unequal, 3–5 pair larger petiolulate, intermediate minute sessile; cymes many-fld. on long erecto-patent supraaxillary ped.; pedic. articulate above the middle, ebracteate, erect in fl., reflexed in fr.; fl. erect umbellate rather large lilac-b. or w., cal.-lobes linear-lanceolate narrow subelongate; berries drooping $\frac{1}{2}$–$\frac{3}{4}$ in. in diam. globose or rarely subobovoidal, smooth pale dull gr. or yellowish, sometimes subviolascent. — Linn. Sp. 265; Vill. Dauph. ii. 495; Lam. Ill. no. 2328; Poir. in Lam. Dict. iv. 285; Desf. i. 193; Brot. i. 182; Pers. i. 226; Dun. Hist. Sol. 135; Ait. Hort. Kew. i. 399; Spr. i. 677; Koch 584; Dun. in DC. xiii. 1. 31; Gren. et Godr. ii. 544; Willk. et Lange ii. 525. *Battata virginiana* &c. Ger. Herb. 781. *Sol. tuberosum esculentum* &c. Moris. Hist. 522, § 13. t. 1. f. 19. Herb. ann. Mad. reg. 1–3, cultiv. ccc; PS. reg. 1, 2, cult. c; GD. reg. 2, cult. rrr. Growing as a crop everywhere in Mad. from the sea-beach up nearly to the highest elevations (6000 ft.) and here and there coming up spontaneously as a straggler from cult. Not introduced into PS. (as I was assured in 1828 by the then governor of that island) earlier than 1820-1825. At all seasons, according to elevation or supply of water.—Pl. with usually a peculiar heavy fetid smell. St. thick juicy tender hollow angular 1–2 ft. high. L. large about 9 in. long, petiolate; the terminal lft. 3–4 in. long and 2–3 broad, the lateral pairs narrower and gradually smaller downwards, all paler or sometimes albescent beneath. Ped. pedic. and cal. strigosely pilose. Fl. rather handsome and conspicuous. Berries when dead-ripe slightly fragrant like Lilac-fl. or Primroses, sometimes in England used for pickling; the vinegar neutralizing their deleterious narcotic property, if any. The tubers in Mad. are almost uniformly of excellent quality and form a large proportion of the food of the whole population.

The so-called Potato-disease affected Mad. about 25 years ago simultaneously and to a like calamitous extent as it did England, Ireland, &c.; causing great distress at first, but re-

lieved by the providential introduction at the moment and extended cultivation of the Demerara Batata (*B. edulis* (Thunb.) subvar.). The disease has now however (1871) almost wholly disappeared.

S. insigne Lowe in Journ. Hort. Soc. i. 178 (Lond. 1867), introduced by myself about 10 years ago from the Canary Islands, but doubtless of South-American origin, occurs already not unfrequently in cottage gardens. It is a small tr. or arborescent shr. about the size of *Brugmansia suaveolens* (Willd.), with handsome shining foliage (the young l. claret-coloured), moderately large very fragrant pale pinkish-w. or blush-w. fl. in short drooping compound rac. or racemose forked cymes and fine orange-coloured fr. (single or several in each racemose cyme), in Tenerife the size and shape of a hen's egg, but in Mad. smaller narrower and more pointed at each end, said to be eatable raw and serviceable in cookery like Tomatos (*Lycopersicum esculentum* L.). Its diagnosis is as follows:—

§ *Melongena* Dun.

S. INSIGNE Lowe. Subarboreum inerme omnino glabrum; fol. oblongo-ovatis ovatisve subobliquis subacuminatis basi cordatis integris, utrinque nudis; cymis dichotomo-racemosis, fr. magno ovoideo v. ellipsoideo aurantiaco nitente glabro.—Folia lucida intensius sublurido-viridia, juniora atro-sanguineo-purpurea v. vinoso-violascentia, in pl. junioribus luxuriantibus maxima. In omnibus partibus pl. amat violascere.

††3. LYCOPERSICUM Tourn.

††1. L. VULGARE Lowe. **Tomato.** *Tomate.*

Rank-smelling subviscid subglandularly hispid-villous; l. hispidly pubescent or substrigose odd-pinnatisect, lfts. oblong-ovate irregularly inciso-toothed veiny-rugose very unequal at the base, 3 or 4 pair larger petiolate, the intermediate minute cordate entire petiolulate; cymes stalked sparsely racemose not many-fld., ped. supraaxillary erecto-patent, pedic. subelongate articulate at or above the middle, ebracteate; rac. and fl. subnutant; berries drooping opake, scarlet, red or y.—*L. esculentum* and *L. pyriforme* Spr. i. 677. *L. Humboldtii, pyriforme, cerasiforme* and *esculentum* Dun.—Herb. ann. Mad. reg. 1, 2, cc; ND. $\frac{c}{2}$. Varr.:—

a. cerasiforme; rac. simple; fr. evenly globose size of a small cherry or marble scarlet, red or orange-y.—*L. cerasiforme* Dun. Hist. Sol. 113, t. 3, B (fr.); Dun. in DC. xiii. 1. 26; Webb Spic. Gorg. 162; J. A. Schm. Fl. Verd. 238. "*L. Galeni* Mill. Dict." (Dun.). *L. Humboldtii* Dun. Hist. Sol. 112; WB. iii.! 282; Dun. in DC. xiii. 1. 25; Griseb. W. I. Fl. 436. *Sol. ly-*

copersicum β Linn. Sp. Pl. (ed. 1) 185, (ed. 2) 265; Poir. in Lam. Dict. iv. 287. *S. pseudo-lycopersicum* Jacq. H. Vind. i. 4, t. 11; Willd. Sp. Pl. i. 1034; Pers. i. 226.—In beds of ravines, waste ground, vineyards, gardens &c. or on rocks and walls, both cult. and growing spontaneously everywhere below 2000 ft. about Funchal and other towns or villages in Mad. Not noted but doubtless similarly existing in PS. Completely naturalized on the central rocky crest of ND. It has been found also in the Great Salvage by S^{r} C. C. de Noronha; and in the interior of S. Iago, one of the Cape Verdes, between the Ribeira dos Picos and the Boa Entrada of S^{ta} Catarina, I found it mixed with *Momordica charantia* L., overspreading in vast tangled beds or masses whole miles of mountain tracts at an elevation of 3000–4000 ft. above the sea. Throughout the year, and thus especially useful in winter and spring when γ is wanting.—St. gr. succulent yet hard or firm and stiff, 2–4 ft. long, loosely straggling, diffuse or decumbent, rounded or sometimes angular. Foliage harsh very flaccid and fast withering. L. 6–8 in. long; lfts. about 2 in. long and 1 broad, full or dark gr., sometimes pinnatifid or even pinnatisect and whitish or glaucescent beneath. Hairs of st. and petioles stiffish pellucid shining horizontally patent, a few bulboso- or capitato-glandular. Rac. 5–7-fld.; ped. and rachis round firm stiff straight, each 1–2 in. long; pedic. round slender 4–9 lines long or more, ebracteately articulate mostly much above the middle, the lower part stiffly divaricate and the short upper thickened and geniculately refracted in fr. Cal. divided nearly to the base into 5 linear-elongate obtuse hairy lobes 3 lines long, or about half the length of cor.-lobes, loosely patent or reflexed in fr. Cor. deeply stellate lemon-y. nearly 1 in. in diam. from point to point, scentless. Anth. y. united at top into a short open- (obtusely 10-crenate-) mouthed tube level or nearly so with the gr. subcapitate or clavate stigma. Berry completely 2-celled, each cell partially subdivided by an incomplete flat axile *septum*; smooth shining 6–9 lines in diam., juicy acidulous with a nauseous vapid taste, but excellent and much employed in cookery. Seeds numerous compressed suborbicular shining ochre-y. mucilaginous smooth and surrounded by a gelatinous (when dry membranous and subpellucid) smooth brighter y. distinct rim or border, reminding one of *Spergularia fallax* Lowe; the body of the seed when dry naked and minutely shagreened or papilloso-puncticulate in the middle, finely and closely radiato-striolate with closely depressed hairs gradually longer towards the margin and so forming a sort of fine fringe at the inner edge of the smooth and even limb or border.—Doubtless the original stock of the sp. The fr. varies much in size and colour.

β. *pyriforme; Tomate Cabaca*; fr. evenly obovate or shortly

pear- or bottle-gourd-shaped, "red or y."—*L. pyriforme* Dun. Hist. Sol. 112, t. 26; DC. xiii. 1. 26. *Sol. pomiferum* "Cav. Descr. 112;" Pers. i. 226.—Rarely cult. in Mad. and not observed in the Canaries or Cape Verdes. According to Dunal himself in DC. l. c., not differing from *α* except in shape of fr.

γ. esculentum; rac. often bifid; fl. polymerous; fr. depresso-spheroidal torulose sulcate multilocular.—*L. esculentum* "Mill. Dict. no. 2;" Dun. Hist. Sol. 113, t. 3, C; Seub. Fl. Az. 38; Coss. et Germ. 274; DC. xiii. 26; Willk. et Lange ii. 524. *Sol. lycopersicum* Linn. Sp. (ed. 1) 185, (ed. 2) 265 (excl. var. *β*); Lam. Ill. no. 2330, t. 115. f. 2; Poir. in Lam. Dict. iv. 287 (excl. var. *β*); Desf. i. 194; Brot. i. 182; Pers. i. 226; Ait. H. K. i. 399. *Poma amoris* Ger. Herb. 275. *Solanum pomiferum fructu rotundo* &c. Moris. Hist. iii. 520, § 13. t. 1. f. 7.—In Mad. as in the Canaries and Cape Verdes, cult. only in gardens or vineyards. About Funchal &c. frequent, but only in summer and autumn.

Whole aspect, foliage, &c. exactly as in *α*, but perhaps somewhat more robust and dwarfed in habit, with stouter or more succulent less elongated st. or branches. Fl. the same in form, size and colour, but cal. 6–20-partite, cor. 6–15-lobed or stellate, anth. 6–15 polyadelphous and "style multifid." Fr. orbicular deeply depressed or umbilicate, the diam. far exceeding the axis, grooved or torulose like a melon or pumpkin or Pitanga, $1\frac{1}{2}$–3 or even 4 in. in diam., blood-red or scarlet, rarely y., more rarely ivory- or pale greenish-w., many-celled, somewhat more firm and fleshy or less juicy than in *α*; excellent sliced raw in vinegar as a salad, or stewed whole as a vegetable &c.

Though regularly propagated by seed in gardens, this seems to be nothing but a form or race with monstrous fl. and fr. of *α*, differing in nothing whatever, so far as I can discover and as Dunal indeed confesses in DC. l. c., but the irregularly polymerous fl. and fr. (formed from the combination and partial suppression as it were at once of several (2–5) fl. and ovaries into one) and the perhaps somewhat more succulent and robust st. and habit. Nor have I ever once seen it either in Mad., the Canaries or Cape Verdes growing spontaneously (wild or naturalized) like *α*, out of gardens, in which, along with *α*, it is in Mad. regularly raised from seed. Whether its seeds however, when not growing under cultivation, really revert to *α*, I have not ascertained. It would be an experiment well worth making.

4. Normania Lowe.

1. N. triphylla (Lowe).

Herb. ann. scentless subtomentoso-pubescent glandular-viscous; st. branched from the base erect stiff firm fistulous angular submarginate; l. petiolate ternatisect trifoliolate, terminal lft. petiolulate large ovate acute equal and often subcordate at the base, obsoletely and subrepandly (rarely sharply) toothed or entire, the 2 lateral subsessile smaller more oblong and entire, very unequal at the base; a few of the lower l. 5-foliolate, of the upper 1-foliolate simple; rac. 5–10-fld. axillary or nearly so (at first terminal) erect more or less distinctly stalked, in fl. scorpioidally congested or corymbose, in fr. elongate; fl. and fr. drooping unilateral; ped. in fr. erecto-patent, pedic. strongly refracted and with the rachis and ped. wholly ebracteate and inarticulate; berry the size of a small cherry, depresso-globose smooth even orange or dull deep blood-red (croceo-rubens or atro-sanguinea) more or less concealed by the much enlarged and leafy open cal. with loosely erect or spreading leaf-like ovate-acute lobes. — *Nycterium triphyllum* Lowe Novit. 15 or 537. *Solanum trisectum* Dun. in DC. xiii. 36. *Sol. Nava* Reichenb. in WB. iii. 123, t. 174; Dun. l. c. 37 (status suffrutescens) ?— Herb. ann. Mad. reg. 2, 3, rr. "S. Vicente below the Gingeiras, on the roadside to the Paul," not above cultivation, at a height of "about 1000 ft., July 1837," Dr. C. Lemann; "above P^{to} da Cruz, along the Levada dos Lamaceiros a little beyond the Rocha Furada," Dr. Lippold; in the Cerca at S. Antonio da Serra; about a mile down the Voltas descending from the Cruzinhas to Seixal in a place amongst the forest or thick native brushwood lately cleared by fire. June–Sept.— In habit or aspect, foliage and fl. fallaciously like the common Potato (*Solanum tuberosum* L.), but truly differing in its real affinities and characters; altogether herbaceous and ann. Root fibrous, peculiarly small proportionately, with few short stiff pale or whitish subdivisions, not stoloniferous or tuberiferous. Whole pl. very viscid, with rather dark or dull gr. foliage, 1½–2 or 3 ft. high. Branches straight or slightly flexuous, at first succulent, but presently hard stout and rigid, subtriangular and downwards slightly winged or marginate, remarkably fistulose, clothed like the petioles, ped., rhachises, pedic. and cal. with dark greenish or tawny brown soft simple glandular-viscid spreading furry crisped or somewhat woolly hairs. L. soft and flaccid more shortly or finely adpresso-pubescent or velvety, much as in *Physalis peruviana* L.; petioles 1 in. long; lfts. all (except a few 1-foliolate of the uppermost, and 5-foliolate of the lower) ternate; terminal lft. 2–3 in. long, 1½–2 in. broad; the 2 lateral opposite, 1¾ in. long, ¾ in. broad, very unequal

and conspicuously cut away at their base quite to their midrib on their upper or outer side, very variably toothed, mostly subentire. Cymes simple stalked ebracteate, in fl. scorpioidally corymbose abbreviate, in fr. elongato-racemose 2–4 in. long (including the ped.) or about the length of the l. Pedic. in fr. about ½ in. long. Fl. handsome and conspicuous, much like those of the Potato (*Sol. tuberosum* L.), but rather smaller, pale v.-blue or lilac, scentless. Cor. openly and widely rotato-campanulate, shortly 5-lobed or 5-angular, the size and shape of that of *Physalis peruviana* L., dull greyish lavender-b. or lilac, dark or blackish in the eye or centre; the tips of the lobes ciliato-pubescent outside. Cal.-lobes adpressed to cor. ovato-lanceolate or lanceolate-acute, half the length of cor., much enlarged and leafy in fr. but open or only partially concealing the shining smooth even dull dark red or or.-red berry which is 4 or 5 lines in diam. Anth. dark or blackish, all bursting by a longitudinal slit downwards from the top, the 2 or 3 lower 3 or 4 times the length of the upper, curved or subarcuate and with a short lobe, horn, or spur on one side near the base: all from the first distinct and separate; their 2 cells tumid downwards. Fil. short simple united at the base into a narrow ring. Style simple slender filiform subelongate ascending; stigma small indistinctly subclavato-capitate subbilobed. Seeds about 20, rather large i. e. 3–4 mill. long, 2½–3 broad, flat oblong-reniform, coarsely granulate or punctate, smooth.

Dr. Lemann's S. Vicente roadside specimen from the Gingeiras in my Herb. is a state or form, from a less shady lower situation, with stiffer smaller more sharply and distinctly toothed l. than in the usual sylvan states of the pl. in higher and more shady spots. This probably helped to induce Webb and Reichenbach to regard the Can. pl., which agrees in foliage more closely with the normal Mad. sylvan form, as a distinct sp. (see WB. l. c. line 4 from bottom of page 123).

With the habit and aspect of *Solanum tuberosum* L. and coming near to *Lycopersicum*, this very curious and interesting plant has the racemose inflorescence of *Pionandra* or *Cyphomandra*, the leafy cal. of *Atropa* or *Triguera*, the angular cor. of *Physalis* or *Triguera*, and the many-seeded juicy berry of a *Solanum*. It comes nearest (Mr. Miers thinks almost too near) to *Triguera* Cav.; but differs in its free distinct mostly and always finally unequal not included stamens and anth., the latter not connivent or coherent into a cone and some mostly elongato-arcuate (with the cells turgid

downwards) and often with a spur-like lobe or horn at their base; in the many-fld. rac., secund inarticulate ebracteate pedic. (devoid of cup-shaped or any sort of br.), pulpy and juicy many-seeded fr., and heteromorphous (partly 3–5-pinnatisect) and altogether viscoso-tomentoso-pubescent foliage, st., &c. It is also strictly Macaronesian, not Gerontogean; *Triguera* being apparently confined to Spain, and neither the Mad. nor Can. groups possessing indigenously any others of the specially characteristic pl. of that part of the continent, or *vice versâ*.

Nycterium Vent., founded solely on the inequality of the stam. and anth., has been lately universally abandoned. It is indeed a wholly artificial group of pl. belonging truly to *Solanum*. Thus the Mad. pl., referred by me 40 years ago to *Nycterium* Vent., as then its nearest known related group, and subsequently to *Solanum* by Dunal, becomes open to commemorate the many valuable botanical discoveries effected by Commander Norman R.N. in Mad.

The Canarian *Solanum Nava* Reichenb. in WB. iii. 123, t. 174; DC. xiii. 37, is probably a mere suffrutescent form or state of the usual sylvan form of the Mad. pl., from which it differs in nothing I can find but its elongated sarmentose "woody" or suffrutescent branches, its bifid cymes or rac., and simple 1-foliolate l. As to this last point however, Webb's or Bourgeau's specs. in BH., like his figure t. 174, exhibit merely the upper ends of branches, wanting entirely the lower l. And so indeed the late Dr. Lemann's Can. spec. from Despreaux (Webb's collector), and sent by him as "*Solanum* nova sp.," was considered by Lemann *in litt.* at the time (1837) to be perfectly "identical" and "not to differ in the least from" his original herbaceous ternatisect-leaved specs. of the Mad. pl.

Tribe II. *Physalideæ.*

††5. PHYSALIS L.

§ 1. *Eurystorrhiza* Don; herbaceous, root strong per., st. sometimes suffrutescent or persistent at the base. Cal. even in bud large conspicuous.

* Pubescence simple not stellate.

††1. P. PERUVIANA L. **Cape Gooseberry.** *Tomate Inglez.*

Per.; pale greyish gr. or hoary softly villoso-pubescent or velvety-pilose erectly fork-branched, branches stiff angular-sulcate; l. stalked acuminato-cordate entire or here and there repandly sinuato-dentate, softly velvety and flaccid; fl. erect shortly pedicelled; cor. ochraceous-y. with 5 black central spots; anth. v.; cal. in fr. obsoletely 5-angular obturbinately globose pale ochraceous or straw-coloured; berry y.—Linn. Sp. (App.) ii. 1670; Lam. Dict. ii. 101; Pers. i. 22; Ait. H. K. i. 394; Dun. in DC. xiii. 1. 440; Miers Illustr. ii. t. 39, C; Griseb. W. I. Fl. 435; Willk. et Lange ii. 529. *P. edulis* Sims in BM. t. 1068. *Herschelia edulis* Bowd. Exc. Mad. 34, 35. *P. pubescens* Buch! 193. no. 188; Spr. i. 698; Holl's List in Hook. J. of Bot. i. 20; Seub. Fl. Az. 38; Wats. in Godm. Az. 198 (not Linn.). *Solanum vesicarium radice crassa Mexicanum* &c. Moris. Hist. iii. 526, § 13. t. 3. f. 17.—Herb. per. Mad. reg. 1–3, formerly (1826–1850) ccc; now (1850–1871) c; not seen in PS. or the Desertas, nor received from the Salvages. Growing out of walls and rocks in dry sunny places, beds of ravines, rocky banks &c. about Funchal &c. everywhere formerly, but now (1871) become almost rare! All the year round, but in fr. chiefly July–Sept.—Root or root-stock strong per. pale or whitish; st. ann. Pl. 1–2 ft. high leafy more or less silvery-greyish gr., sometimes slightly viscid but hairs or pubescence simple furry; suffrutescent downwards. Petioles slender ½–1 in. long; l. 1½–3 in. long, 1–2¾ in. wide, the edges wavy and mostly repandly 1 or 2-toothed on each side. Fl. mostly solitary and axillary rarely binate; pedic. erect in fl.; drooping or reflexed in fr. 3 or 4 lines long slender. Sep. in all stages very acute. Cor. 6–9 lines in diam. shallowly but acutely 5-angularly plicate shortly ciliate-pubescent at the edges and all over pubescent outside, ochre-y. with 5 large square coal-black spots or dashes in the middle which are ciliate as it were, or fringed at their edges. Anth. large erect shortly oblong, 2 lines long, 1 line broad, at first connivent, then altogether free and separate, exserted just out of the throat which is closed with a ring of dense inflexed yellowish silky hairs; before bursting square

strongly bilobed pale shining steelly b.; after bursting oblong, twice as long as broad, dark v.; rising out of the throat and bursting longitudinally from top to bottom in succession, one at a time. Pollen greyish w. Fil. round not dilated at the base, smooth shining v., at first shorter, afterwards a little longer than the anth. Style smooth shining v., a little longer than the stam.; stigma gr. abruptly depresso-capitate bilobed, lobes not decurrent. Ov. smooth pale or whitish, obsoletely 2 or 4-lobed, obtusely 10-angular or sulcate downwards and immersed at the base in a waxy-y. fleshy cup-shaped ring or nectary, 2-celled many-seeded. Cal. in fr. much enlarged and globosely inflated, bladdery, reticulated, scarcely or not prominently 5-angular, closely contracted at the mouth and apiculate, at first pale gr., then dry and pale or whitish straw-colour. Fr. or berry globose smooth shining full bright deep lemon-y., the size of a cherry or marble i. e. 6–8 lines in diam., loosely but completely enclosed within the bladdery cal. Seeds flat imbedded in a gratefully acidulous juicy pulp, very cooling and acceptable to a weary wanderer in hot summer weather.

The fr. is deservedly much esteemed for tarts, preserves &c.; and formerly (1826–1830) was so abundant that it was usually sold in the husk or calyx in July and August at 5*d.* per bushel. At present the pl. has become so scarce that the same quantity, if at all procurable, would be worth at least five times that price. As a preserve it is remarkable for its viscous or glutinous substance, rich deep golden colour and peculiar quite *sui generis* flavour.

In 1826, I was told by many old people in the north of the island that they remembered its being quite a scarce pl. It has now returned to that condition everywhere. In 1826 I found it universally abundant. It began to fall off in prevalence from 1840 onwards to the present time.

I cannot find the slightest ground for separating this pl. into dentate- or entire- or small- or large-leaved varr. α, β, γ, δ, as by Dunal in DC. l. c. All these states or stages may be often observed in the selfsame individual pl.

B. *Orthembryoneæ.*

†††Tribe III. *Cestreæ.*

†††6. CESTRUM L.

†††1. C. VESPERTINUM L. *Boas Noites* or *Bellas Noites.*

Arboreous or arborescent copiously leafy; branches round straight stiff subvirgate striolate shining even smooth pale ash-coloured, the upper arcuately subdeclining; l. solitary shortly stalked subcartilagineo- or chartaceo-membranous, lanceolate or lanceolate-oblong acuminate subundulate entire, subcarinate and recurvedly spreading or drooping, smooth shining dark gr. with paler nerves and midrib; fl. pale yellowish gr., opening and fragrant at night, sessile in short axillary erect shortly stalked leafy-bracteate fasciculato-capitate interrupted spikes much shorter than the l.; cal. short obsoletely or obscurely toothed, the teeth or lobes indistinct abbreviate subobtuse and like the tube, bracts, rachis or whole spike more or less rusty-tomentulose; cor.-tube linear cylindric slender filiform, lobes erect with inflexed margins by day, reflexed with margins revolute by night; anth. subsessile, their fil. edentate attached to cor.-tube nearly to their top; fr. . . . . .—Linn. Mant. alt. 206; Murr. Linn. Syst. Veg. (ed. 13) 190; Murr. Comm. Nov. Gott. v. 41, t. 8; Hérit. Stirp. 72; Pers. i. 230; Jacq. Hort. Schönbr. iii. 43, t. 328; Willd. Sp. i. 1055; Spr. i. 673; Dun. in DC. xiii. 1. 661; Griseb. W. I. Fl. 443. *C. jamaicense* Lam. Dict. i. 687 (excl. *β*). " *C. confertum* Mill. Dict. no. 5." *C. nocturnum β. pubescens* and *C. Bella-sombra* Dun. in DC. l. c. 632. *Ixora alternifolia* &c. Jacq. Amer. 16, t. 177. f. 8.—Small tr. or arborescent shr. per. evergreen Mad. reg. 1, $\frac{c}{5}$. In and about Funchal, Machico, &c. June–Sept.—A tr. 20–30 ft. high normally, with a bushy head and distinct trunk as thick as a man's leg or thigh, but mostly in Mad. lopped and cut back into a shr. 10–15 ft. high, and so used as a fence or screen in gardens, growing readily and rapidly from slips or branches, and when lopped or cut, throwing out strong vigorous rank stout elongated straight or virgate large-leaved rapid-growing shoots. Whole pl. smooth except the cymes and buds or quite young tips of the shoots and petioles, which are clothed with a pale rust-coloured short close furry *tomentum*. St. and older branches with a pale ash-coloured smooth and even bark, the latter subfragile woody evenly rounded, stiffly straight subvirgate shining-whitish or olive-grey finely striolate and lenticelled; the uppermost with subdistichous (at first straight, then) slightly arcuato-declining side branchlets, their l. smaller ($1\frac{1}{2}$–$2\frac{1}{2}$ in. long) narrower and more strongly recurved and cari-

nate or subconduplicate like those of a Peach- or Almond-tr. (*Amygdalus persica* or *A. communis* L.) than on the rest of the tr. Whole pl. strongly and rankly fetid like Elder (*Sambucus nigra* L.) when cut, bruised or broken, and rank or coarse in habit, growth and foliage; its ready, vigorous and rapid growth from slips or branches accounting doubtless for its long-continued preservation in Mad. rather than the fine nocturnal fragrance of its otherwise unattractive fl. Petioles short 4–6 lines long, light gr., channelled above, whilst young furfuraceo-puberulous or mealy-tomentulose. L. dark shining gr. above, paler but full shining gr. beneath, membranous and fast withering, yet stiffish or chartaceous but not at all coriaceous, lanceolate-oblong or oblong-lanceolate acuminate, subobtuse or subacute and mostly equal at the base, widely channelled or subconduplicate, the 2 sides rising at an angle from the midrib all their length above, carinate beneath, their upper half recurved; 3–7 in. long, 1–2½ broad, the midrib and simple equidistant and parallel primary side-nerves pale or light gr., impressed above, prominent beneath, the nerves arcuately ascending, 7 or 8 in the smaller upper l., 12 or 13 in the larger, on each side the midrib. Petioles of the young fresh-growing shoots or branches mostly pseudo-stipulate by the premature development of two minute l. from their axillary buds; but these very soon fall off. Fl. small inconspicuous very numerous pale yellowish gr., nearly or quite scentless by day but deliciously fragrant at night from sunset to sunrise, in lateral axillary short erect leafy-bracteate shortly stalked subcorymbose or fastigiato-capitate interrupted spikes mostly about half the length of the l. or (with their ped.) 1–2 in. long, never longer than the l.; each terminating in a sort of condensed umbel, head or fascicle of crowded aggregate agglomerate cymules or of congested single sessile fl., with 2 or 3 detached scattered solitary or binate sessile fl. below down the ped. or rachis, each like the terminal head or tuft subtended by a small lanceolate deciduous gr. leafy br. These spikes are sometimes slightly compound or paniculato-corymbosely branched, and sometimes reduced to small sessile fascicles of few or 2 or 3 or even single solitary fl., towards or at the ends of the branches or on the short side-spurs or knobs or leafy branchlets on the old wood below the l. Fl. in bud at first shortly ovoidal-oblong truncate and often blackish, tipped with w. *tomentum*, before the cor. appears; the latter before expansion of the limb slenderly subclavate. Fl. all nearly or quite sessile, articulated on the rachis, with either a single petiolate gr. leafy lanceolate br., or one or more sessile rusty-tomentulose membranous minute scale-like close-pressed inconspicuous ovate or ovato-lanceolate caducous bractlets at their base. Ped., rachis, bractlets and cal. more or less furfuraceo-puberulous or mealy-tomentulose pale rusty, the

ped. and cal. becoming gr. as the fl. advance. Cal. shortly tubular-cylindric or shallow tumbler-shaped, neither attenuate at the base nor stipitate, 2 lines long, 1 broad, tomentulose or mealy-puberulous, herbaceous somewhat fleshy full gr. often speckled or tinged with blackish purple on the upperside, obsoletely or shallowly and bluntly erosulo-5–4-toothed or crenulate, the teeth woolly at the edges. Cor. (including the limb) 5 or 6 times the length of the cal., entirely smooth, yellowish gr. outside sometimes speckled or tinged on the upperside with blackish purple, hypocrateriform; tube long slender filiform-cylindric scarcely at all infundibuliform or clavate but with a slight strumous swelling at top (corresponding with the position of the anth.) and a constriction close above it at the base of the limb; 8 lines long from base of cal., ¾–1 line broad at top of cal. and 1–1½ broad at its swollen part at top; limb 5-partite or now and then cruciately 4-partite, lobes when flatly or horizontally expanded obtuse or subobtuse oval or broadly ovate, appearing acute and narrow-linear i. e. half a line broad only from the inflexion or reflexion of their margins, 2½–3 lines long, 1¼–1½ broad, erect and closed by day, reflexed by night; each lobe bisulcate inside, bicarinate outside, with broad pale gr. margins which are inflexed by day, spreading or revolute by night, very finely and minutely velvety-pubescent and tomentuloso-ciliolulate, the whole inside of cor. otherwise smooth and pale whitish gr. or greenish primrose-colour; diam. of expanded limb ½ in. Stam. included in tube, the anth. reaching to its top or edge of mouth and very nearly sessile on its sides, small subglobosely oval or ovate, erect, at first ochraceous-y., then Indian-red or brown, their fil. slender filiform and entirely smooth throughout; pale, adnate to cor.-tube very nearly or almost quite their whole length, without the least trace of a tooth at the origin of their very short free part at top or anywhere; pollen greyish w. Stigma full gr. clavato-capitate bilobed by a transverse groove, just overtopping the anth.; style smooth pale filiform. Ov. smooth ovoidal like an acorn, blunt, obsoletely 4 or 5-lobed at top, 2-celled, many-seeded, the upper half black or atro-purpureous, the lower gr. and adherent to the cal.-tube; hypogynous ring or nectary halfway down the ov. indistinct and obsolete, obscurely tumid and crenulate. Fr. never produced in Mad., the whole fl. falling off with ov. and cal.; but described by Grisebach l. c. as "ovoid, blue," shortly tapering at the base, and by Lam. l. c. as "a berry of the shape but half the size of an olive, nearly black with blackish-violet juice, containing in two distinct cells about 4 large oblong seeds."

This differs from *C. nocturnum* L. in its shortly peduncled short spike-like contracted or condensed abbreviate cymes

almost always shorter and never longer than the l., spicato-corymbose fasciculato-capitate interruptedly crowded or congested sessile fl. with a cylindric-filiform cor.-tube, very short edentate fil., and indistinctly, obsoletely or confusedly toothed always more or less rusty-tomentulose cal.

There can, however, be scarcely any reasonable doubt of some perhaps peculiar or abnormal spec. of this Mad. pl. having been the types of Dunal's *C. nocturnum* β. *pubescens* and *C. Bella-sombra*; no other sp. of the genus except the above having been seen in the island by any other botanist till within the last 8 or 10 years, during which *C. fastigiatum* Jacq., *C. aurantiacum* Lindl. and a 3rd (*C. Parqui* Hérit.?) equally different from *C. vespertinum* L. have been introduced into a few gardens.

At the same time, it should be remarked, that Grisebach in W. I. Fl. p. 444 refers *C. Bella-sombra* Dun. along with *C. megalophyllum* Dun. to *C. macrophyllum* Vent.; an association which does not seem however at all warranted by the descriptions in DC. at least of the 3 pl.

There is no *Cestrum*, or any other pl. at all, called "*Bella-sombra*" in Mad., where the present pl. is known solely and universally by the name of *Boas* (or sometimes *Bellas*) *Noites*. The name of *Bella Sombra* on the other hand, in all Spain and Portugal, as also, if I remember right, in the Canaries, is exclusively and constantly applied to *Phytolacca* (*Pircunia* Moq. in DC.) *dioica* L.; a tr. planted everywhere about towns &c. (Lisbon, Madrid, Cadiz, Seville, Gibraltar &c.) in the public walks (Praças or Alamedas) on account of its close thick shade.

There is a considerable resemblance both in the aspect and fragrance of the fl. between the present pl. and certain sp. of *Daphne*. Nothing can exceed the fragrance. It reminds one most perhaps of that of some *Daphne*, resembling a mixture of hyacinths or primroses and peaches, with an ethereal spicy aromatic pungent freshness perfectly entrancing; streaming down at night upon the wind far from its origin, but so partially, that whilst perfuming powerfully one side of a narrow road or alley, there will often be no trace of it perceptible on the other side. It is strongest about midnight and is scarcely distinguishable, even close at hand, before sunset or after sunrise.

Order LXV. ATROPACEÆ.

Fl. perfect regular 5-merous. Cal. inf. gamosepalous free persistent (at least by its base) mostly leafy and enlarged in fr., 5-toothed or 5-fid valvate or subimbricate in bud. Cor. hypogynous gamopetalous *infundibuliform or tubular-campanulate*, limb 5-lobed, lobes often subunequal *imbricate or subinduplicato-imbricate in bud.* Stam. mostly all perfect and equal alternate with and as many as cor.-lobes, inserted on its tube, "one sometimes shorter, 3 very rarely sterile;" anth. bursting longitudinally, equal. Ov. 2- (rarely spuriously more-)celled; placentas, ovules and style as in SOLANACEÆ; stigma 2-lobed. Fr. capsular or baccate. Seeds numerous compressed reniform or oval; embryo mostly arcuate or nearly straight, rarely annular or spiral; cot. semiterete or oval compressed and fleshy. —Herbs or shr. with mostly solitary subextraaxillary often large conspicuous w. or cream-coloured fragrant fl.

A. *Fr. baccate.*

Tribe I. *LYCIEÆ.*

Cal. small simple cup-shaped subirregularly or obsoletely 5-toothed fleshy wholly persistent. Cor. infundibuliform not large. Anth. short free distinct. Embryo spiral; cot. semiterete.—Submaritime low or stunted straggling often spinose shr. L. simple lanceolate or spathulate entire often fascicled. Fl. small lavender-b., p. or lilac.

1. LYCIUM. Cal. tubular-campanulate or cup-shaped somewhat fleshy 5-toothed or 5-fid, with the teeth often irregular or subconfluently subbilabiate, wholly persistent, not or scarcely enlarged in fr. Cor. tubular-infundibuliform; tube contracted below the insertion of the stam., constricted and circumscissilely caducous at its base leaving a persistent ring or cup embracing the base of ov.; limb 5–4-fid, lobes blunt oblong or rounded. Stam. 5–4 alternate with cor.-lobes, mostly subunequal; anth. short free distinct (not connivent or coherent) bursting longitudinally. Style simple, stigma depresso-capitate. Ov. 2-celled multiovulate seated on a short stalk or hypog. fleshy disk and within the persistent shallow free cup-shaped base of the cor.-tube. Fr. juicy berry-like, ovate, oval or globose, 2-celled, many-seeded. Embryo spiral; cot. semiterete.—Shr. with stiff rigid or sarmentose and flexile flaunting often spinose branches. L. simple quite entire alternate, often fleshy and fasciculate. Fl. small axillary and terminal

pedicellate mostly solitary sometimes binate or few-fasciculate; pedic. simple exarticulate; cor. ochroleucous, p., red, b. or lilac, scentless, circumscissilely separating close above its base. Berries scarlet, red or o., rarely black or b., mostly small, sometimes edible. Seeds flat reniform.

†††Tribe II. *SOLANDREÆ.*

Cal. large subspathiform inflatedly tubular leafy wholly persistent. Cor. large campanulato-infundibuliform. Anth. oblong short free distinct. Embryo arcuate or nearly straight.—Sarmentose large rampant shr. with large drooping trumpet-shaped fragrant fl. and simple coriaceous l.

†††2. SOLANDRA. Cal. large membranously leafy elongate inflatedly tubular 5-angular irregularly 2–5-fid or -toothed, splitting down mostly bilabiately and with the teeth valvately connivent and more or less cohering, not deciduous in fr. Cor. large tubular-infundibuliform or campanulato-trumpet-shaped, tube fleshy elongate ventricosely swollen or inflated upwards and again contracted below the 5-fid (rarely 6–7-fid) limb; lobes broadly rounded undulately revolute, some of them crispato-fimbriate or crenate at the edges. Stam. 5 equal included; anth. distinct free broadly oblong short, affixed above their middle, bursting longitudinally. Stigma small simply capitate or subcapitate. Ov. 2- or imperfectly 4-celled multiovulate. Fr. berry-like fleshy or pulpy, enclosed in the wholly persistent membranous split-down cal., 2- or partly 4-celled, many-seeded. Seeds reniform compressed; embryo slightly curved or arcuate; cot. semicylindric.—Sarmentose climbing shr. with large simple entire subcoriaceous l. and large handsome terminal solitary yellowish-w. or cream-coloured or ochraceous fl. often tinged or streaked with p. (peach-blossom) or v. Fr. rather large fleshy scarcely edible.

B. *Fr. capsular.*

††Tribe III. *DATUREÆ.*

The Thorn-Apple Tribe.

Cal. as in *Solandreæ* but in fr. circumscissilely deciduous a little above the thickened persistent base. Cor. large simply tubular infundibuliform. Anth. linear-elongate or shortly oblong connivent or subcoherent bursting longitudinally, mostly erect or adnate. Embryo slightly curved or arcuate. Cot.

semicylindric.—Subarborescent shr. or fetid herbs. L. simple membranous. Fl. large or conspicuous w., reddish o., or purpurascent.

††3. BRUGMANSIA. Cal. large membranously leafy elongate inflatedly tubular 5-angular irregularly 2–5-toothed, or spathiform and split down on one side only; cor. as in *Solandra* but simply infundibuliform or tubular (not ventricose), with lobes of limb strongly angulato-plicate twisted in bud attenuato-acuminate aristate or horned, all with the edges even and entire. Stam. 5 included; fil. adnate to cor. ½ way up or more; anth. erect linear-elongate or linear-oblong *connivent or coherent* at least at first *into a tube round the style*, bursting longitudinally. Stigma *linear-oblong* or subcapitately oblong 2-lamellate or bilobed, lobes linear deflexed decurrent. Ov. conico-oblong 2-celled, multiovulate. *Caps. subsiliquiform* narrow-elongate cylindric-oblong and attenuated at each end or elliptic-subulate, *unarmed* stiff but somewhat soft or membranous, 2-*celled* many-seeded *indehiscent*. Seeds as in *Solandra*.—Shr. or subarboreous. L. simple. Fl. large pendulous, at first cream-coloured, then pure w., limb sometimes or.-red.—Differs not less from *Datura* than from *Solandra* in the fr. and long slender linear coherent anth.

††4. DATURA. Cal. large leafy tubular elongate 5-angular or 5-ribbed 5-toothed or 5-fid, often splitting down 1–2-labiately and with the teeth obsolete or cohering. Cor. infundibuliform or trumpet-shaped 5-angular, tube elongate, limb 5-toothed or 5-horned, sometimes 6- or 10-toothed or lobed, lobes angulato-plicate twisted in bud. Stam. 5 included, anth. erect *free distinct short* linear bursting longitudinally. Stigma *capitate* 2-lobed or 2-lamellate. Ov. 2-celled, spuriously or partly 4-celled, multiovulate. Caps. *globose or ovoidal* naked *echinate* 2-celled *semi*-4-*celled* (i. e. upper half 2-, lower 4-celled) *opening at top by* 4 *valves*, many-seeded. Seeds reniformly oval or subtrigonal, embryo arcuate.—Robust or coarse strong-smelling fetid *herbs*, occasionally frutescent. L. large simple angularly cut or toothed. Fl. large handsome solitary alary (from the forks of the st. and branches) or axillary, w., cream-coloured, or violascent. Caps. large hard coriaceous erect or drooping. Seeds dark brown or black.

††Tribe IV. *NICANDREÆ*.

Cal. large 5-partite leafy wholly persistent bladdery and inflatedly enlarged in fr. and closed or contracted at the mouth.

Cor. moderately large campanulate. Anth. shortly oblong or oval free distinct; fil. dilated and vaulted at the base. Embryo annularly arcuate.—Herbs with handsome pale b. fl. Fr. dry but berry-like completely enclosed, as in *Physalis*, in the bladdery cal.

††5. NICANDRA. Cal. 5-partite large leafy wingedly 5-gonal, the wings or angles prominent compressed, lobes sagittato-cordate very acute, membranous connivent and much inflated and enlarged in fr. Cor. campanulate, limb shallowly 5-lobed, lobes rounded spreading or reflexed. Stam. 5 equal short subincluded; fil. flexuous vaulted and dilated at the base, connivent over the ov.; anth. oval affixed below or near their apex. Stigma globosely capitate, of 5 connivent lobes. Ov. 3–5-celled seated on a fleshy crenulate disk, many ovulate. Fr. berry-like globose 3–4- or 5-celled, many-seeded, dry, with a thin brittle irregularly bursting pericarp enclosed freely in the capsuliform inflated reticulately bladdery cal. Seeds reniform-compressed; embryo plano-spiral; cot. semiterete.—Ann. herbs with solitary or geminate alary or extraaxillary drooping specious pale b. fl. Fr. quite dry and inedible.

Tribe V. *HYOSCYAMEÆ.*

The Henbane Tribe.

Cal. herbaceous somewhat enlarged and altogether persistent in fr. Cor. campanulato-infundibuliform. Anth. short globosely ovate or oval free distinct erect adnate bursting longitudinally. Fr. a capsule operculate and circumscissilely dehiscent, embryo subspiral; cot. semiterete.—Viscid mostly fetid herbs. L. large mostly simple. Fl. lurid y. or b., mostly reticulate.

6. HYOSCYAMUS. Cal. tubularly urceolate or infundibuliform, limb 5-toothed or 5-fid, rigid and enlarged but not inflated in fr. Cor. campanulato-infundibuliform sometimes partly split down on one side, limb oblique 5-lobed, lobes unequal subobtuse. Stam. 5 declining included or exserted; fil. vaulted at the base. Caps. contained within the enlarged hard coriaceous cal., urceolate 2-celled many-seeded. Seeds small reniform compressed, embryo annular subspiral, cot. semiterete.—Clammy softly downy dull gr. or greyish herbs, with angularly or sinuately toothed or pinnatifid l. and axillary solitary mostly secund dull ochraceous or y. reticulately veined fl.

†††Tribe VI. *NICOTIANEÆ.*

The Tobacco Tribe.

Cal. herbaceous or leafy, altogether persistent and enlarged in fr. Cor. hypocrateriform or tubular-infundibuliform. Anthers as in *Hyoscyameæ*. Fr. a capsule 2-celled many-seeded 2- or 4- or many-valvate at top. Seeds minute, embryo slightly curved or straight, cot. short semiglobose or ovate.—Mostly viscid fetid herbs, rarely subarboreous. L. simple large entire. Fl. subconspicuous.

†††7. NICOTIANA. Cal. tubular-campanulate 5-fid. Cor. infundibuliform or hypocrateriform, limb 5-lobed plicate, twisted in bud. Stam. 5 included or exserted. Ov. 2-celled many-ovulate with a thick basal obsoletely lobed ring (nectary). Stigma capitato-pileate or cap-shaped, "2-glandular within." Caps. inclosed by the enlarged cal., 2-celled, many-seeded, 2- or 4- or many-valvate at top, valves at length bifid. Seeds oval subreniform rugulose, embryo slightly curved.—Herbs or suffrutescent, rarely subarboreous, mostly clammy downy or pubescent, rarely smooth. L. quite entire large. Fl. gr. w. y. p. or purple in terminal paniculate corymbose or racemose cymes, rarely axillary solitary.

A. *Fruit baccate.*

Tribe I. *Lycieæ.*

1. LYCIUM L.

Sect. *Brachycope* Miers: lobes of cor. short, one third to one half the length of the tube. Stam. mostly subincluded or not longer than cor.

1. L. EUROPÆUM L. *Espinheiro.*

Shrubby erect smooth spinose, branches spinescent terete stiff straight virgate, only the elongated young shoots sometimes lax and curved or arcuate; l. fleshy fascicled lanceolate or spathulato-lanceolate subacute or obtuse often oblique, finely attenuated downwards into short distinct petioles; pedic. short, in fr. hamate; cal. subequally 5-toothed or shallowly 5-fid, not or only sometimes indistinctly subbilabiate; stam. exserted from the tube, shorter than the cor., style about the same length; cor.-limb and tube (pale greyish lavender-b.) reticulately veined, tube 2 or 3 times the length of limb; berry drooping globose or ovoidal obtuse or.-red.—Linn. Mant. i. 47, Syst.

Nat. (ed. 12) ii. 177; Lam. Dict. iii. 510. no. 4 (at least the syn. and most of descr.); Ill. no. 2266; Desf. i. 196; Brot. i. 284; Pers. i. 231; Fl. Gr. iii. 30, t. 236; Spr. i. 700; Koch 583; Rchb. in WB. iii. 286 (quoad pl. ex ins. Palma); Buch Can. List, 175. no. 51 (do. do.); Miers Illustr. ii. 95, t. 64 B; Gren. et Godr. ii. 542; Willk. et Lange ii. 532. *L. mediterraneum* Dun. in DC. xiii. 1. 523. sect. 1 *breviflorum* (excl. sect. 2 *longiflorum*). *L. maderense* Miers! "Ins. Madera Lemann 552" (i. e. no. 552 *L. europæum*? MS. Lowe) v. quoad spec. *Lycii* omnia Maderæ et Portus S^ti^ in HH. "*L. salicifolium* Mill. Dict. no. 3." *Jasminoides aculeatum Salicis folio, flore parvo ex albo purpurascente* Michel. Pl. Nov. Gen. 224, t. 105. f. 1. *Cestrum scandens* Bowd.! Exc. in Mad. 91 (not Vahl, Pers.).—Shr. per. Mad., PS., reg. 1, $\frac{c}{2}$. Here and there in detached bushes near the sea all along the S. coast of Mad., e. g. at the Praia formosa, on the roads to S. Martinho and S. Amaro, at Calheta, Paul do Mar &c., and to the eastward beyond S^ta^ Cruz towards the cemetery, and near the sea-cliff salt-spring on the Penedo do Saco (P^ta^ de S. Lourenço); in PS. forming a hedge along the lane from the landing-place up to the town and used for fences generally in the whole sandy district about the town. Apr. or May–Dec.; fr. March–May.—A stiff erect moderately thorny shr. 2–5 ft. high with scant foliage and pale bleached or whitish stout firm straight rigid hard thickish knobbed or knotted both laterally spinose and terminally spinescent erect or erecto-patent rarely horizontal branches; the more vigorous young shoots elongate and subarcuately erecto-patent (not declining) round (not angular) purplish-v. or lilac and often slightly pruinose or mealy towards their ends. L. more or less fleshy pale dull leaden or greyish mealy-gr. alternate and solitary at first on the new shoots, fascicled on the spurs or knobs of the older branches, mostly $\frac{1}{2}$–$1\frac{1}{2}$ in. long (including petiole), 2–4 lines wide. Axillary spines at first short (3–6 lines) stout strong woody pungent erect or erecto-patent, ultimately horizontal and half to an inch or more long. Fl. 1 or 2 together from the axils of l. or short axillary spurs or knobs, erect or drooping $\frac{1}{2}$ in. long, each on its own short slender mealy or mealy-puberulous angular pedic. which is 1–3 lines long and a little thickened upwards; the whole much shorter than the l. Cal. cup-shaped, 1 line long, fleshy not at all scarious, gr. smooth or mealy-puberulous, with 5 shallow slightly unequal or irregular teeth, not distinctly bilabiate but with 2 shorter or more obsolete than the other 3, and split sometimes partly down on one side. Cor. 5–6 lines long, regularly narrow-infundibuliform, altogether pale greyish lavender-b. with dark reticulating veins and nerves, turning as it withers pale brown, the tube furry-puberulous downwards within, throat naked, the 5 lobes spreading (not reflexed) equal broad

rounded shallow, not above $\frac{1}{3}$ the length of the concolorous (not gr.) tube, their edges minutely puberulous. Stam. half-exserted, the rather large elliptic-oval anth. reaching to or a little above the base of cor.-lobes and versatile or affixed by their middle to the fil., of which the free part, like the style, is quite smooth. Style as long as or a little longer than the stam., stigma distinctly depresso-capitate. Fr. (only 4 berries seen) in 2 examples pendulous, in one (growing from the under side of a horizontal branch) ascending vertically on its abruptly hooked pedic., exactly ovoidal obtusely rounded at both ends, $2\frac{1}{2}$–$3\frac{1}{2}$ lines or 5–7 mill. long × 2–$2\frac{1}{4}$ lines or 4–5 mill. broad, smooth shining or.-y. or bright full or.-red. Cal. enlarged as long as the ripe berry itself, of which it closely embraces the base only, pale yellowish gr. fleshy, with 5 short ovate subequal or slightly unequal distinct teeth, the 3 or 4 upper sometimes rather longer than the lower, rendering it subbilabiate not bifid; tube not usually split down, turbinately or pyriformly attenuated at the base into the short (2–3 lines) abruptly and strongly hooked ribbed or angular pedic.

Though flowering abundantly, the fr. is extremely rare; and it escaped not only my own observation for 30 years or more, but that of Webb, Holl, Lemann, Lippold, Mouiz, Norman &c. and indeed apparently of every other earlier Mad. botanist. I first met with a single ripe berry on a low stunted depauperated almost leafless bush which, though I have not seen its fl., I believe to be merely a starved (from drought) more thorny and fleshy-leaved maritime state of the sp.,—near the brackish sea-cliff spring (Fonte) on the Penedo do Saco, March 6th 1861; and again, on the same bush, two nearly ripe pale orange-y. berries and a single small subabortive unripe gr. one, May 21st 1871, having looked for fr. or fl. on it in vain several times in the interim. Still, ripe fr. must be sometimes or somewhere more abundantly or frequently produced, judging from the very general diffusion of the pl.; and the rarity of the one and wide dispersion of the other may be both perhaps attributable to the same cause, viz. the early and eager devouring of the fr. by birds.

The only points in which I can perceive the Mad. pl. to differ from *L. europæum* of authors are the lavender-blue fl. and ovoidal fr. The former may be probably ascribed, as in the fl. of *Hydrangea hortensis* Sm. and *Ipomœa rubro-cærulea* Hook. in Mad., to the peculiar soil. The latter is perhaps no difference at all,

seeing that on one side Dunal l. c. describes the fr. in *L. europæum* L. as "ovato-globose," and considering on the other hand the insufficiency of 3 or 4 berries of the Mad. pl. from one bush only to establish as a constant character their ovoidal shape, especially in the face of their being reported by the country people in Mad. to be "round like a ball, not egg-shaped."

In the Canaries I met with and instantly recognized, precisely this Mad. *Lycium* in Palma only, whence also spec. from F. Bourgeau exist in BH. and HH. no. 924, under the name of *L. europæum* L. In the other islands and especially in Lanzarote and Fuerte Ventura occurred another sp. with the same stiff thorny habit but with erect ovate-acute or elliptic orange-coloured fr., which at Aria in Lanzarote, where it abounds down the ravine below the town, is eaten by the children under the name of *Romame*. Is not *L. afrum* Reichenb. in WB. iii. 285 a compound of this Lanz. pl. with the fr. of true *L. afrum* L. from elsewhere? I at least never met with the true *L. afrum* (Mich. 224, t. 105. f. 2) in any one of the Can. islands; and if this common and abundant Lanzarotan and Fuerte-Venturan sp. be not intended by the *L. afrum* Reich. in WB., it is not otherwise recorded in the Phytogr. Can. It may be called, if previously undescribed, *L. canariense*.

†††Tribe II. *Solandreæ*.

†††2. Solandra Sw.

†††1. S. macrantha Dun.

Wholly smooth; st. and branches woody trailing sarmentose; young shoots virgate or arcuato-virgate elongate; l. coriaceous smooth elliptic-oblong and acute or obtuse and mucronate, cuneate at the base, shining dark gr.; fl. terminal subsolitary nearly sessile; cor. 5-lobed; anth. erect atropurpureous within; stigma simply globoso-capitate; "berry acuminate pale not red within."—Dun. in DC. xiii. 1. 533. *S. grandiflora* BM. t. 1874 et Hortul. plur. (nec Sw. nec Jacq. &c. sec. Dun. l. c.). *S. grandiflora* Griseb. W. I. Fl. 433 (partly). *Datura sarmentosa* β Lam. Ill. no. 2295; Dict. vii. 463.—Shr. per. evergreen Mad. reg. 1, cult. r. In gardens about Funchal, running over walls or trained (as formerly at the Palmeira) as a border-fence; growing and flowering luxuriantly but never fruiting. May–Sept.—A loosely rampant shr. with stout woody st., trailing or

climbing extensively but not without support; the older branches pale cinereous with the l. crowded towards their ends, the young shoots shining olivaceous or atropurpureous greatly elongated and loosely erecto-patent with the l. remote. L. 3 or 4–6 in. long, 1½–2 in. broad, wholly smooth, dark shining gr. above, paler dull glossy with 5 or 6 prominent parallel nerves on each side the midrib beneath; the margins mostly slightly or partially subrevolute; the 2 or 3 floral l. close below the pedic. smaller and like some of the lower l. spathulate retuse or mucronulate. Petioles 1½–1¾ in. long, channelled above, bright gr. Fl. mostly 1 rarely 2 or 3 together at the ends of the branchlets erect or pendulous, fragrant especially at night, large, conspicuous. Pedic. short thick smooth subangularly turbinate fleshy gr. like an inferior ovary, 4–6 lines long, 3 thick at base, 5 at top. Cal. quite smooth gr. leafy carinately 5-angular unequally 2–4-toothed, 3 or 2 of the normally 5 teeth being mostly concrete into 1 or 2 broad 2–1-carinate teeth; either 2-labiate or oftener split down nearly or more than halfway on the lower side only, 2½–3¼ in. long; teeth triangular-ovate acute, their tips marcescent. Cor. 5- (very rarely 4-)fid quite smooth outside, slightly or thinly lanato-pilose inside downwards, the tube 5½–6 in. long, pentangular downwards, inflated upwards, from 10–12 lines at top of cal. to 1½–2 in. in diam. an inch below the limb, then again a little contracted, yellowish gr. inside and outside downwards, lighter and pale-greenish buff-y. upwards, with 5 gr. nerves reaching to the base of lobes; limb w. or cream-col., the lobes unequal short broad rounded waved reflexed or revolute, 3–4 smaller quite or partially entire, the 4–1 larger wholly or partly crispato-fimbriate, all at first pure w. then cream-col. and finally bright buff or nankeen-col. Stam. declinato-ascending, reaching to top of tube or nearly to base of lobes; style a little longer, declining and then curvato-ascending. Fil. quite smooth shining pale gr. rounded throughout, attached to the cor.-tube nearly halfway up. Anth. oval-oblong short broad remarkably flat and thin obtuse or rounded at top, subcordate at the base, before bursting ochre-y., afterwards dark atropurpureous or blackish claret-col. inside, but whitened outside by the copious mealy-w. pollen, erect affixed by their base, not versatile, 4 lines long, 2 broad. Style 6½ in. long or ½ in. longer than the stam. smooth rounded pale shining gr., sometimes tinged with lilac or pale purpurascent upwards; stigma gr. simply capitate like a small pin's head, i. e. a small globose uniform velvety gr. knob or button without the least trace of lobes or division, 1¼ mill. in diam., abrupt not at all decurrent but scarcely broader than the style immediately beneath it. Ov. quite smooth shining pale gr.-waxy-y., pyramidato-conoidal 2-celled many-ovulate with a tumid fleshy 10-sinuato-crenate ring at its base. Fr. never produced in Mad., the fl. soon caducous with their pedic.

Dunal's description l. c. perfectly agrees, except that even with the lens I can perceive only sometimes a faint line and certainly no "*sulcus*" in the stigma. Thus it is certainly his *S. macrantha* as distinguished from his *S. grandiflora* Sw. (l. c. 535); and though the two are reunited by Grisebach (W. I. Fl. 433), it is noteworthy that the fl. in the Mad. pl. have not the slightest tinge of p. or peach-blossom, as they have in *S. grandiflora* Sw., the "Peach-blossom Trumpet-flower" of the W. Indies.

S. guttata Don in Bot. Reg. t. 1551 (Dun. in DC. xiii. 1. 536) was introduced into Mad. from Mr. Tate's nursery gardens in England as an unknown pl. in or about 1832. It grew luxuriantly, soon flowering, but not fruiting; and still perhaps exists in the Achada garden where it was first planted.

B. *Fruit capsular.*

††Tribe III. *Datureæ.*

††3. Brugmansia Bernh.

††1. B. suaveolens (Bernh.). *Bellas noites. Trombetas.*

Subarboreous smooth or glabrescent, young shoots l. petioles and ped. at first puberulous; l. ovate-oblong or elliptic entire membranous nearly smooth, the nerves and veins only puberulous; fl. axillary solitary pendulous on short thick cernuous puberulous pedic.; cal. nearly smooth 5-toothed; cor.-tube 5-angular, the angles triple-nerved or ribbed pubescent, the interspaces smooth; lobes of limb shallow shortly horned or mucronate; anth. permanently coherent or conglutinate.—"Don Gen. Syst. iv. 475, excl. syn. Mill. et Mnch." (Dun. in DC.). *Datura suaveolens* Poir. Suppl. v. 255; Dun. in DC. xiii. 1. 545, 690; Griseb. W. I. Fl. 433. *Datura Gardneri* Hook. in BM. at t. 4252 (*D. cornigera* Hook.) in text p. 2, note. *D. arborea* hortul. et auct. plur. (non Linn.).—Tr. or arborescent shr. per. Mad. reg. 1 or scarcely 2, ccc. In gardens, vineyards &c. everywhere with or without cult., and sometimes when left to itself, as in the north between the Entrosa and P^ta^ Delgada, completely choking up with a thick jungle small damp ravines; deciduous and not flourishing above 1000 ft., yet producing fr. more frequently and abundantly than lower down. At most seasons, chiefly Apr.–Dec.—A small tr. or shr., 10–15 ft. high, with either a single distinct trunk as thick as a man's thigh, or several stout st. as thick as the arm or leg, covered with a shining smooth pale drab or whitish bark. Older or top branchlets subtortuous or flexuous brittle pale or whitish; younger vigorous shoots thick stout straight flexuously striolate. Foliage

large and copious; l. always perfectly entire, membranous thin and flaccid, reticulately veiny or subrugulose, fast withering, shining light or full gr. above, paler and conspicuously reticulate beneath, the nerves and veins on both sides finely puberulous; 6 or 8–10 or 12 in. long, about or nearly half as broad, acute or subacuminate not cordate but a little narrowed and mostly very unequal at the base. Petioles stout 1–2 in. long. Fl. very large w. pendulous aromatically fragrant. Pedic. 1–1½ in. long. Cal. 4½–5 in. long, 1½ broad pale gr. shining nearly or quite smooth, the teeth or lobes subequal broad shallow, ½–¾ in. deep, 2 of them sometimes coadnate. Cor. trumpet-shaped, (including cal.) about a foot long, the tube on emerging from the cal. ½ in. in diam. gradually wideuing into 6 or more inches in the limb, which is pure w., the tube being greenish downwards and the whole cream-col. or greenish ochraceous in the bud. Stam. and style included, ⅔ length of cor. or about 8 in. long; fil. round slender 6¼ in. long, w. pale greenish downwards, united to cor.-tube ¾ of their length, hirsute downwards from about an inch below their top to within 1 or 2 in. of their base, the rest smooth. Anth. erect affixed by their base linear about ¼ length of fil. 18–20 lines long, scarcely 1½ broad, subciliate at the edges, w. or cream.-col. without, brown within, closely united into a tube, never separable without force; bursting introrsally, pollen greyish w. Style very slender round smooth throughout; stigma 4 or 5 lines long, scarcely 1 line broad, narrow-oblong flattened very little if at all broader than the style itself, equalling or exserted ¾–1 in. beyond the anther-tube; stigmatic lobes not prominent narrow linear decurrent down the edges. Ov. gr. quite smooth pyramidally oblong gradually attenuate upwards into the style, obsoletely subpentangular 2-celled many-ovulate. Nectary or *torus*? a thick fleshy pale gr. sinuato-pentangular obtusely crenate subpuberulous shallow ring, from which originate the stam., copiously honey-bearing. Caps. dry pale brown arcuate pod-like 3–4 in. long, narrowly elliptic, beaked or attenuate at each end, indehiscent.

The fl. are slightly fragrant by day, but much more powerfully and diffusedly so after sunset and through the night, when, by moonlight, they display an almost radiant or phosphorescent snowy whiteness, and expand more fully, falling into elegant thick horizontal rows or flounces on the tr. or bushes. Nothing can exceed their grace and loveliness, when in full luxuriance and perfection, which they may be said to attain at intervals of 4–6 weeks continuously from June to Nov. or Dec.

The tr. is esteemed noxious; and therefore in Mad. of late years has been banished from gardens and proximity to houses.

This idea perhaps originated from an accident which occurred some 40 years ago, when 2 or 3 children, having eaten a few of the seeds, escaped by timely medical assistance with no further harm than the effects of an overdose of *Atropa Belladonna* L. Still there is something perceptibly oppressive in an evening in too long or close inhalement of the powerful aromatic fragrance of the fl.

B. sanguinea (Ruiz et Pav.)=*B. bicolor* Pers., Lindl. Bot. Reg. t. 1739=*Datura sanguinea* Dun. in DC. xiii. 1. 545, occurs frequently in gardens.

††4. Datura L.

* Caps. erect.

††1. D. Stramonium L. **Thorn-apple.** *Bufareira.*

Smooth or glabrescent fetid; st. erect short stout smooth round simple, dichotomously branched at top, branches like the st. hard rigid woody, stiffly spreading; l. stalked ovate or ovate-oblong acute or acuminate cuneate and unequal at the base, coarsely sharply and unequally sinuate-toothed; fl. erect solitary in the forks of the st. and branches, shortly stalked; cor. about twice the length of the smooth 5-winged 5-toothed pale gr. cal., w. or violascent; base of cal. in fr. reflexed; caps. ovoidal subequally echinate.—Brot. i. 169; Koch 586; Gren. et Godr. ii. 546; Dun. in DC. xiii. 540; Willk. et Lange ii. 533.—Herb. ann. Mad. reg. 1, 2.—Varr. :—

a. genuina Gr. et Godr. l. c.; wholly gr., cor. w.—*D. Stramonium* Linn. Sp. 255; Fl. Dan. t. 436; Vill. Dauph. ii. 488; Lam. Ill. no. 2289, t. 113; Dict. vii. 459; Desf. i. 187; EB. t. 1288; Pers. i. 216; Ait. H. K. i. 387; Buch 193. no. 186; Sm. E. Fl. i. 314; Spr. i. 627; WB. iii. 118; Seub. Fl. Az. 38; Coss. et Germ. 277; Webb Spic. Gorg. 162; J. A. Schm. Fl. Verd. 235; Bab. 234; Griseb. W. I. Fl. 434.—Mad. reg. 2, r. Corn-fields, waste ground and roadsides at the Achada of P^{to} Moniz; a weed in the late Mr. Webster Gordon's kitchen garden at the Mount, 30 or 40 years ago. Aug.–Oct.

β. chalybæa Koch l. c.; st., branches, petioles, nerves of l. beneath, cal. and cor. v. or v.-purple.—Gren. et Godr. l. c.; Willk. et Lange l. c. *D. Stramonium β. Tatula* Dun. in DC. l. c. *D. Tatula* Linn. Sp. 256; Poir. in Lam. Dict. vii. 461; Pers. i. 216; Ait. H. K. i. 387; Spr. i. 627; Coss. et Germ. 277; Griseb. W. I. Fl. 434.—Mad. reg. 1, c/2. Back of the beach and roadsides at Machico, S^{ta} Cruz &c. May–Dec.

Pl. of very variable size and luxuriance, ranging from a few inches to 2 or 3 ft. in height, with copious dark gr. foliage. Root long w. woody nearly simple perpendicular. Branches widely and stiffly divaricate angular, and with the young l. and petioles mealy-puberulous. L. somewhat fleshy and flaccid or fast withering, 2 or 3 in. long, 1–2 wide, their teeth large unequal remote acute. Cal. membranous 1–1½ in. long, pale gr. bronzed or tinged in β with pale purplish brown, narrowly 5-winged. Cor. scentless in Mad. with shortly and finely awned lobes; in α cream-col. outside, w. inside; in β pale v. or lilac with the throat inside and angles outside darker lilac or v.-purple. Stam. and style ⅔ length of cor., included and not reaching above the throat. Fil. round and smooth upwards, subpubescent and a little thickened and grooved inside downwards below their free portion; their lower half adnate to cor.-tube. Anth. erect adnate affixed by their base, free distinct short linear very narrow, 2 lines long, with (in β) v.-black borders and dull w. pollen. Style smooth throughout and like the fil. pale gr. downwards, paler or whitish upwards; stigma gr. rather large, 3 mill. long, 2 broad, capitate ovoidal, formed of two opposite broad deflexed or decurrent lobes. Cal. after flowering marcescent nearly to the base, and in fr. deciduous, leaving only the gr. cup-shaped base which becomes presently strongly deflexed, forming a hard stiff gr. subplicate or jagged-edged turned-down frill or collar beneath the fr. Caps. erect in the forks of the st., shortly stalked, ovoidal, the size of a Walnut or 2 × 1½ in. diam., dark gr. finally pale brown, covered all over with short hard sharp and pungent subequal conoidal spines and divided into two halves by a vertical shallow groove or *raphe*; 2-celled at top, 4-celled below, the large transversely dilated *placentæ* giving off about halfway down a wing or diaphragm completely subdividing each cell into two; splitting from the top downwards finally into 4 valves; the apical spines but little longer than the rest and not above 3 or 4 lines long. Seeds flattened, roundish oval, subreniform or obtusely subtriangular, dark coffee-brown or black, scrobiculate or corrugately foveolate and very closely and minutely reticulato-pustulate, 4 mill. long, 3 broad: they were formerly and are perhaps still sometimes fraudulently used to adulterate Onion-seeds, which are however much smaller and sharply trigonal.

The foregoing description is from var. β, compared throughout with one of α, which differs in no respect whatever except the few points above specified. Both in Mad., the Canaries and Cape Verdes β is assuredly the common normal state.

** Caps. more or less drooping.

††2. D. Metel L.

Fetid, altogether softly viscido-pubescent dull greyish cinerascent gr.; st. erect round simple branched at top dichotomously; l. stalked ovate or elliptic-oblong entire or repandly toothed, the upper unequally geminate; fl. erect solitary in the forks of the st. and branches shortly stalked; cor. about twice the length of the evenly rounded loose pubescent cal., the limb 10-toothed; base of cal. in fr. 5-lobed patent or reflexed; caps. drooping globose muricate.—Linn. Sp. 256; Lam. Ill. no. 2292, Dict. vii. 462; Pers. i. 216; Ait. H. K. i. 387; BM. t. 1440; Spr. i. 627; WB. iii. 118; Webb Spic. Gorg. 162; J. A. Schm. Fl. Verd. 235; Griseb. W. I. Fl. 434; Willk. et Lange ii. 534.—Herb. ann. Mad. reg. l, r. A weed in gardens or vineyards at or about Funchal occasionally; the Deanery in 1826; and again (1858 and 1871) at the Quinta das Angustias, quite spontaneous but not apparently inclined to spread. June–Jan.—A stout vigorously growing pl. about 2 ft. high with large glaucescent-grey soft flaccid foliage, strongly and nauseously fetid. Branches forked straggling stout stiff, dull purplish, softly or subvillously pubescent. Petioles the same, 2–4 in. long. L. dull gr. softly pubescent flaccid entire elliptic-oblong 5–8 in. long, 3–4 broad, one of the upper geminate l. smaller than the other. Fl. pure w. shortly stalked in the forks of the st., fragrant at night, large i. e. (with cal.) 5 or 6 in. long. Pedic. round, short and erect in fl., deflexed and ½–1 in. long in fr.; cal. pale gr., tube 3 in. long, ½–1 in. broad rounded not angular, 5-toothed, teeth equal ½–1 in. long oblong-lanceolate acuminate. Cor. twice as long as cal., tube greenish downwards smooth 5-ribbed or angular, limb pure w. pubescent outside 2 in. or more in diam. Stam. and style half included i. e. exserted from the throat but much shorter than the limb; fil. smooth adnate to cor.; anth. linear erect. Ov. bristly hirsute, bristles w. erect. Hypog. ring or nectary very shallow or narrow, double, the inner pale or w., the outer greenish, each repandly and irregularly 10-crenate.

Fr. large subglobose prickly all over with short stiffish conic spines, 1½–2 in. in diam., 2-celled, obscurely 2-lobed, the permanent base of cal. forming a stiff, spreading or mostly turned-back, repandly or obscurely 5-angular gr. frill or collar at its base, ½–¾ in. broad. Seeds .....

The whole pl. is most disagreeably clammy and fetid.

In all the Canaries, and most of the Cape Verdes, this is a common and universal weed in waste places near the sea, about towns and villages, in dry beds of ravines &c.

††Tribe IV. *Nicandreæ.*

††5. NICANDRA Adans.

††1. N. PHYSALOIDES* Grtn.

The only known sp.—"Gartn. Fr. ii. 237, t. 131;" BM. t. 2458; WB. iii. 283; Dun. in DC. xiii. 434; Miers Illustr. ii. 34, t. 43. *N. physalodes* Pers. i. 219; Spr. i. 699. *Atropa physaloides* Ait. Hort. Kew (ed. 2) i. 392. *A. physalodes* Linn. Sp. 260 (descr. opt.). "*Physalis peruviana* Mill. Dict. no. 16" (not Linn.). *P. daturæfolia* Lam. Dict. ii. 102 (descr. opt.); Ill. no. 2410. "*Alkekengi amplo flore violaceo* Feuill. Peruv. ii. 724, t. 16."—Herb. ann. Mad. reg. 1, 2, c. Sparingly here and there in waste ground, borders of corn-fields, by roadsides or a weed in gardens, vineyards, &c., about and above Funchal chiefly. Sept.-May.—Very variable in size from 2 or 3 in. with simple st. to mostly 1–3 ft., branched and leafy. Whole pl. smooth scentless and tasteless. Branches stout stiff angular shining pale gr. L. rather large shining dark gr. oblong or oval-oblong acute unequal and cuneato-decurrent at the base all down the petiole, very unequally sinuato-toothed and angular 2–5 or 6 in. long, 1–4 broad, the winged petioles ½–1½ in. long. Pedic. 1-fld. solitary (rarely binate) from the side of each petiole at its base or slightly supraaxillary, ½–1 in. long round slender arcuately cernuous. Cal. even in fl. large inflated leafy pale gr. reticulately veined and membranous, curiously 5-winged at the base by the abrupt turning outwards or reduplication of the lower lateral margins of the subapiculately acute erect lobes; each wing subsagittate or ending abruptly in an acute or subaristate angle at its base. Fl. handsome scentless; cor. campanulate delicate pale b., throat w. with 5 radiating deeper b. spots. Fil. dilated arched and hairy at the base forming connivently a vault over the ov. Fr. drooping; cal. much enlarged, sharply and prominently 5-winged, dry and scarious, closing over and quite concealing the berry; the latter globose, the size of a cherry, pale straw-col. or yellowish brown 4–5-celled, perfectly dry in all stages, finally bursting or breaking up irregularly. Seeds very numerous roundish-lenticular dark y. or tawny.

In 1828 I observed several pl. of this sp. in England, growing luxuriantly on a manure-heap by the roadside a little way out of Hatherne near Loughboro' in Leicestershire.

Wonderfully variable in size and luxuriance, ranging from

* The form *physaloides* is not correct; but it is at any rate better than *physalodes*, which would mean (if not a mere misprint) affinity to φύσαλος, a toad, instead of resemblance to φυσαλίς, a bubble.

2 in. to 8 ft. (as I once saw it) in height, with l. sometimes 15 in. long and 12 broad!

Tribe V. *Hyoscyameæ.*

6. Hyoscyamus L.

1. H. albus L. *Beleno. Meimendro.*

Herbaceous woolly-hirsute viscid dull hoary gr. or cinerascent; branches few remote round stiff hard or woody; l. all petiolate oval or ovate-oblong sinuately or repandly lobed or toothed, the lower suborbicular subcordate, the upper lanceolate subcuneate at the base and subentire; fl. and fr. axillary secund in long produced simple terminal leafy scorpioidal rac., the lower fl. stalked, upper subsessile; fl. pale y. not reticulately veined. —Linn. Sp. 257; Lam. Ill. no. 2414, t. 117. f. 2; ejusd. Dict. iii. 328; Brot. i. 274; Pers. i. 217; Rchb. in WB. iii. 116; Willk. et Lange ii. 534. *H. albus* et *H. canariensis* Spr. i. 615, 616. *H. albus* et *H. major* Dun. in DC. xiii. 1. 548; Gren. et Godr. ii. 546, 547.—Var.:—

β. major; stout and robust, fl. rather large, throat and stam. mostly purpureous.—*H. major* "Mill. Dict. no. 2;" Dun. in DC. l. c.; Gren. et Godr. l. c. *H. albus* Desf. i. 188; Fl. Gr. t. 230; Ait. H. K. i. 389: Buch 193. no. 187; Koch 585; Wats. in Godm. Az. 199. *H. canariensis* Ker in Bot. Reg. t. 180; Spr. l. c. 616; Seub. Fl. Az. 38.—Herb. ann. Mad. reg. 1, $\frac{c}{2}$; PS. reg. 2, $\frac{r}{2}$; SD. c. Sea-cliffs in Mad. general on both the S. and N. coasts, e. g. at the Gorgulho, Praia formosa, Ponta do Sol, Calheta &c., P^{ta} Delgada &c.; PS. in the Serra Dentro in cornfields subremote from the sea. Throughout the year, but chiefly March-Oct.—Whole pl. fetid, but not so powerfully as in *H. nigra* L., with much the habit of a *Verbascum* in its mode of growth. Root strong fusiform or mostly undivided whitish fleshy or a little woody, but decidedly ann., or if biennial only hapaxanthous. St. erect 2 or 3 ft. high, sparingly branched upwards, clothed like the stiff stout rigid thickish erecto-patent branches petioles and cal. with copious soft whitish viscid widely spreading hairs. L. mostly more or less hairy-pubescent and cinerascent, but without the peculiar pale grey aspect of *H. niger* L., and even sometimes, in moist shady spots (like the whole pl.) of a bright grass-gr.! with the l. almost naked. Lower l. 3 or 4 in. long, 2 or 3 broad, on long petioles, subcordate at the base, strongly or coarsely angulato-toothed and almost lobed or at least sinuate; the uppermost or floral narrower entire lanceolate and decurrent into the petiole. Fl. in long virgate (at first scorpioidal) leafy subsecund rac., the lower shortly stalked upper

subsessile. Cor. pale lemon- or sulphur-y. or straw-col., not reticulately veined, the throat usually (but not always in Mad.) deep purple, downy outside, the 3 upper lobes of the limb larger and deeper coloured than the 2 lower. Stam. exserted longer than the cor.; fil. unequal and with the style purplish upwards; anth. large; pollen pale. Cal. in fr. erect almost wholly secund, campanulate somewhat rigid and fleshy enlarged and conspicuous, 1 in. long, resembling a gr. bell-shaped fl.; the limb erecto-patent, disclosing the comparatively or entirely smooth top of the caps. which comes off circumscissilely like a lid. Seeds flattened angular reticulately scabrous light brown.

The root in the Mad. pl. is merely ann., in which respect alone it differs from the descriptions by Dunal and Gren. et Godr. of their *H. major*.

†††Tribe VI. *Nicotianeæ*.

†††7. NICOTIANA L.

* Caps. 2-valvate.

†††1. N. TABACUM L. **Tobacco.** *Tabaca* (pl. *Tabaqueira*).

Herbaceous viscoso-pubescent full or dark gr.; st. round erect virgate, branched upwards; l. large, broadly oblong-lanceolate, acute or subacuminate, sessile and amplexicaul or wingedly petiolate decurrent; fl. stalked in bracteolate terminal loosely corymbiform or paniculate subracemose cymes; cor. viscoso-pubescent outside, infundibuliform, tube clavate not constricted at top, 3 times the length of cal., inflato-clavate for ⅓ its length downwards below the limb, pale greenish, throat and limb p. or rose-col., limb spreading or reflexed 5-gonal, lobes shallow very acute or shortly acuminate; caps. subexserted the length of or a little longer than the cal.—Linn. Sp. 258; Lam. Illustr. no. 2280, t. 113; Poir. in Dict. iv. 477; Desf. i. 189; Pers. i. 217; Ait. H. K. i. 390; Fydell's List no. 115; Spr. i. 615; Coss. et Germ. 276; J. A. Schm. Fl. Verd. 234; Griseb. W. I. Fl. 434; Willk. et Lange ii. 535. *N. Tabacum* et *N. latissima* Koch 586. *Hyoscyamus peruvianus* Ger. Herb. 285, f. 1. *N. major latifolia* Moris. Hist. ii. 492, t. 2. § 5. f. 1.—Herb. ann. or bien. Mad. reg. 1, $\frac{c}{2}$. Vineyards, gardens and waste ground about houses in and about Funchal and most towns or villages in the island. At almost all seasons.—St. 2–3 or 4 ft. high hard stiff gr. L. soft flaccid dark or full gr. with impressed nerves above, paler and brighter gr. beneath with prominent nerves and veins. Whole pl. densely but shortly glanduloso-pubescent and viscid. L. 6–12 in. long, 3–6 broad, all sometimes petiolate, the lower at least mostly sessile; petioles plicato- or undulato-

winged; wings decurrent. Fl. numerous opening 1–2 or 3 together in succession scentless. Cal. like st. br. and pedic. densely viscido-pubescent, the teeth short rather shallow acute, their points a little spreading. Cor. 1½ in. long, oblageniform like a very long-necked inverted flask or bottle; inflated upper part of tube ½ in. long, limb 10–12 lines in diam.; tube about 3 times the length of cal. pale gr., paler upwards; limb dull p. or rose; the whole densely viscoso-pubescent outside, smooth within; limb concave, its lobes or rather angles very sharply acute or acuminato-apiculate broad shallow reflexed. Anth. reaching to the mouth of the throat erect brown, pollen dull w.; fil. very pale gr. smooth, lanato-pubescent downwards. Style smooth a little shorter than stam.; stigma full gr. abruptly capitate or pileiform like a young undeveloped *Agaricus*, bilobed by a transverse groove. Ov. conico-pyramidal smooth gr. 2-celled; nectariferous ring obsolete or none. Caps. 9 lines long, 4 broad, enclosed in the persistent close-pressed cal., ovato-pyramidal or conoidal acute brown smooth, bifid at top, imperfectly 2-celled i. e. 1-celled above the middle. Seeds very numerous and minute, ½ mill. long, flattened, roundish oval, obscurely subreniform, brown, subrugulose.

The damp air of Mad. is unfavourable for the manufacture of this pl. into tobacco &c.; and indeed, even whilst growing, it is apt to be infested with mildew or *Oidium*. Still I have occasionally seen some tolerable cigars made under specially favourable conditions for the drying of the leaves. Formerly its cultivation was prohibited on account of a monopoly now abolished.

The subarboreous *N. glauca* Grah. (in BM. t. 2837; Dun. in DC. xiii. 1. 562), altogether smooth, with slender trunk, glaucous young shoots and poplar-like l. (the latter cordate and long-petioled) and y. fl.,—so widely naturalized in the Canaries and Cape Verdes,—occurs, but has not yet at all established itself in Mad.

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